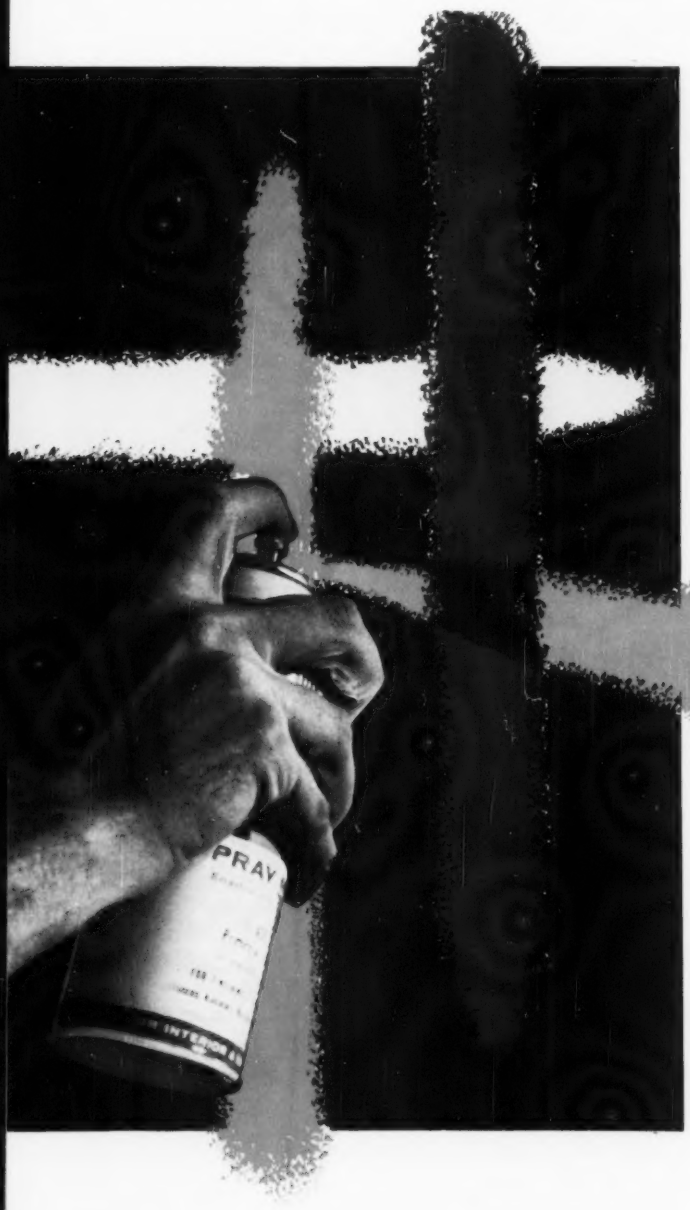
A McGRAW-HILL PUBLICATION

Chemical Week



It was a great year. First look at '59 totals finds top sales, profits . . . . . p. 21

Pellet mill makers woo CPI business, promise solids-processing savings . p. 42

Aerosols: the Midas touch in paints p. 67

Phenol's new frontier. Producers turn to Northwest for expansion sites . . . p. 89

Buy chemicals abroad? Ponder these pros, cons . p. 95

STEVENS RICE GS
UNIVERSITY MICROFILMS IN
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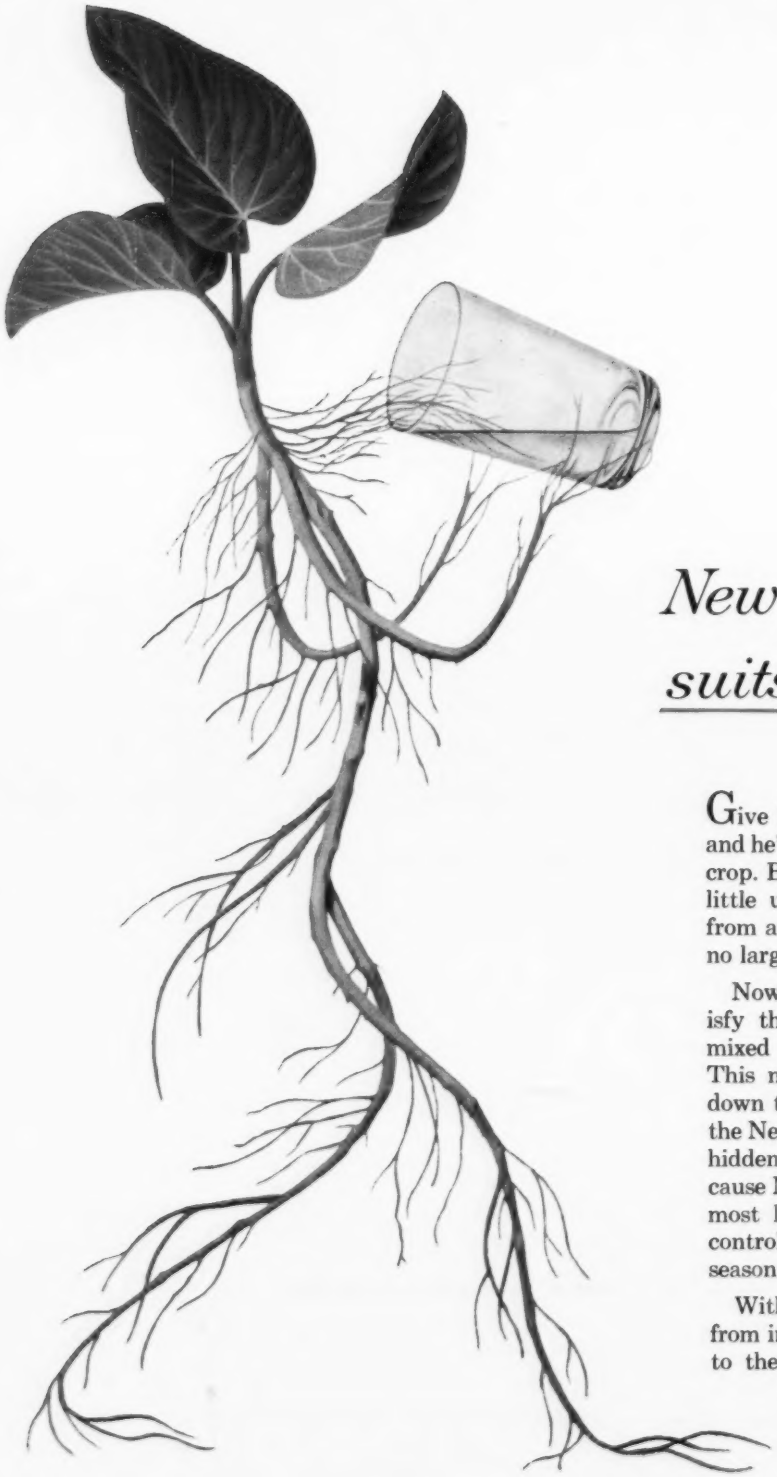
ANN ARBOR MICH C

Febru ents



New kind of water suits the roots!

Give Mr. Root all the water he wants and he's started on his way to a bountiful crop. But water and even fertilizer are of little use if Mr. Root is not protected from attack by root-crippling nematodes no larger than these dots . . .

Now farmers fight nematodes and satisfy thirsty roots with irrigation water mixed with Nemagon® soil fumigant. This new water-with-a-punch is carried down the rows, soaks into the soil where the Nemagon changes to a gas, destroying hidden nematodes as it spreads. And because Nemagon soil fumigant won't harm most living plants, it makes nematode control possible **even** *during* the growing season.

With soil fumigants that protect crops from invisible attack, Shell Chemical gets to the root of a growing problem.

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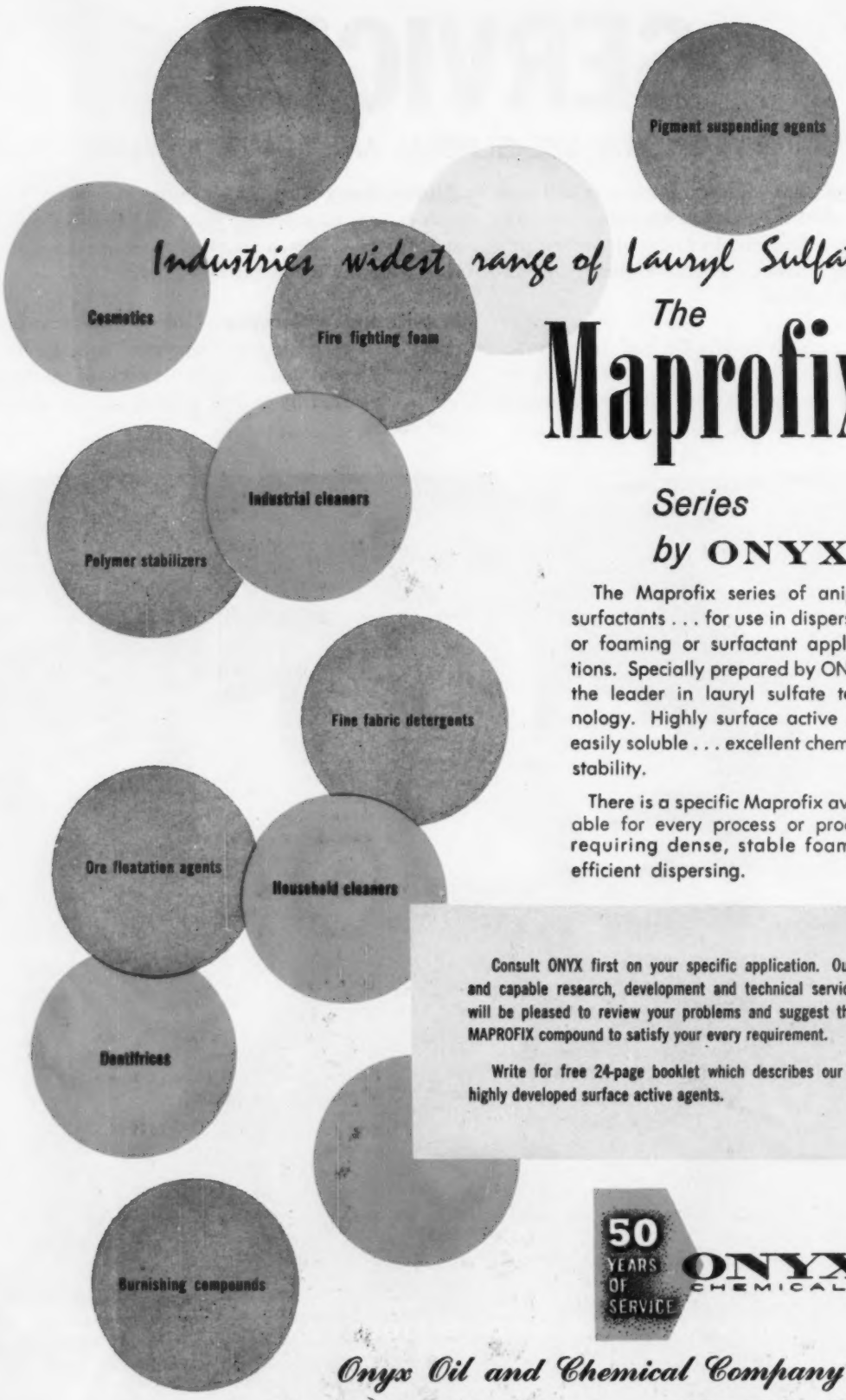

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The Maprofix series of anionic surfactants . . . for use in dispersing or foaming or surfactant applications. Specially prepared by ONYX, the leader in lauryl sulfate technology. Highly surface active . . . easily soluble . . . excellent chemical stability.

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Chemical Week

TOP OF THE WEEK **FEBRUARY 13, 1960**

- **Coal-chemical kingpin Koppers shifts to petrochemicals,** lines up $10-million styrene venture with Sinclair Oil .....**p. 23**
- **Ten years' experience proves value of senior-scientists program;** Monsanto tells pluses, pitfalls of plan .....**p. 29**
- **The pros and cons of computer control.** Key debate point: how soon should the high equipment investment pay off? ..**p. 57**
- **Behind Borden's acquisition of Commercial Ink & Lacquer**—a rounding-out of the company's paper chemicals line ..**p. 77**

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Will stiff U.S. tariff cuts be needed to hold Atlantic alliance together?

13 LETTERS

14 MEETINGS

17 BUSINESS NEWSLETTER

20 Process companies' sales and earnings in '59 set new highs—but '60's marks may be still higher.

22 February's mergers point up efforts to boost research, marketing, expansion programs.

23 India's CPI: new chemical and fertilizer plants are scheduled; but U.S. drugmakers there face licensing problems.

23 Koppers joins with Sinclair Oil in $10-million venture to make styrene at Houston, Tex.

29 RESEARCH
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32 FMC launches epoxidized polyolefins featuring low density, inexpensive formulation.

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80 Coalition of New Jersey companies sets stage for broader programs to promote corporate political interest.

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95 SALES AND DISTRIBUTION
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98 New advertising standards may force changes by ethical and proprietary drugmakers.

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No. 7

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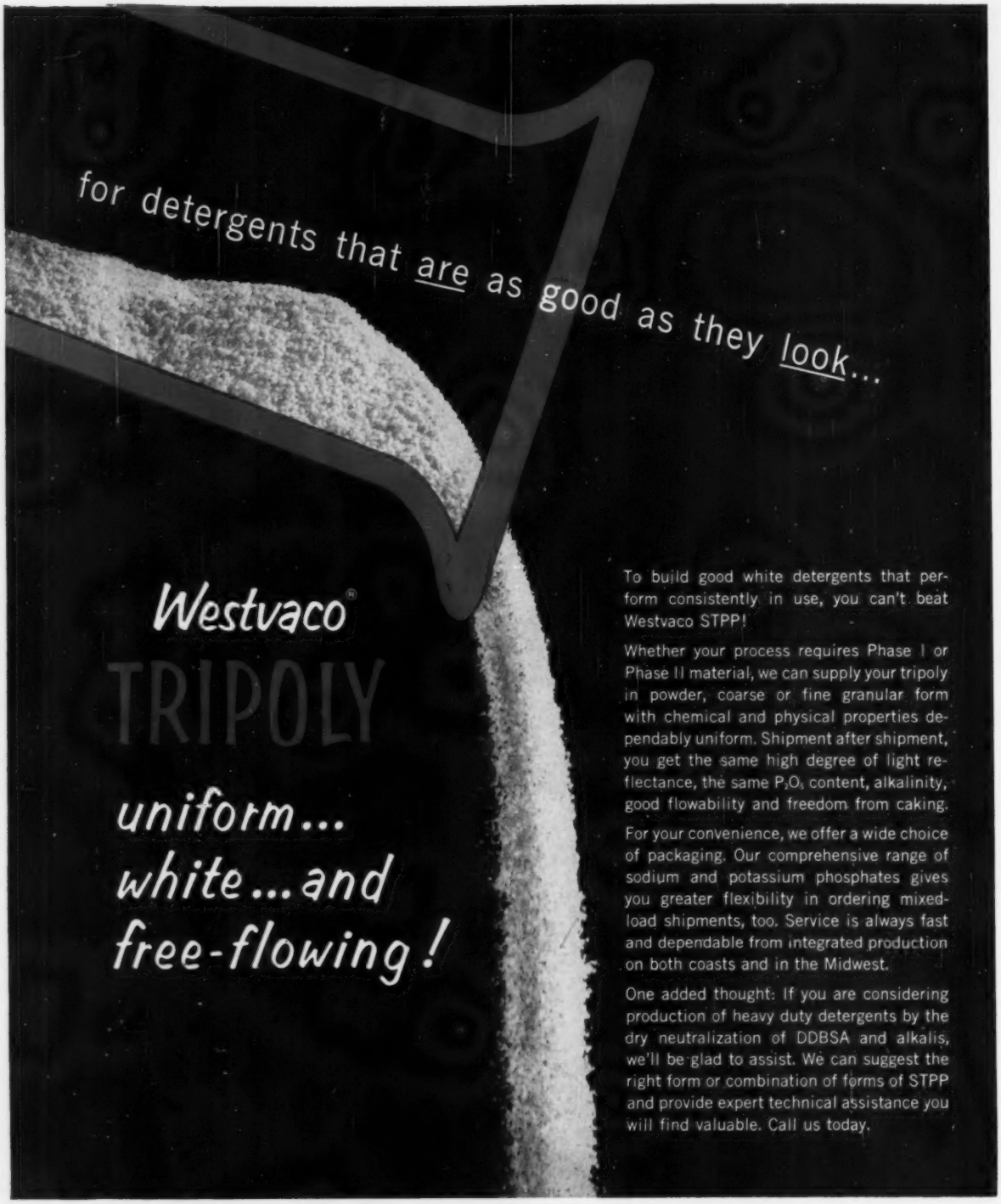

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Whether your process requires Phase I or Phase II material, we can supply your tripoly in powder, coarse or fine granular form with chemical and physical properties dependably uniform. Shipment after shipment, you get the same high degree of light reflectance, the same P_2O_5 content, alkalinity, good flowability and freedom from caking.

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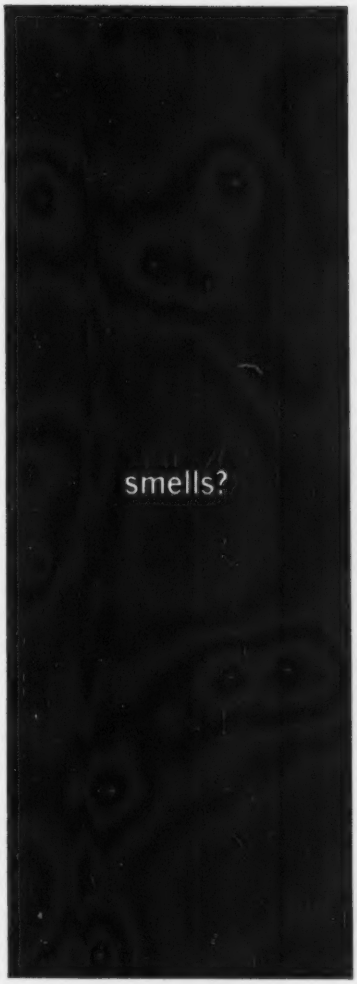

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"MIXING TIME CUT 24%"

—Washington Rubber Company

Processor Saves...Recapper Sells

Edward Malone, General Manager of Washington Rubber Company, checks the gauge uniformity of extruded camelback.

Processing costs go down fast when you use Ameripol Micro-Black masterbatch. Edward L. Malone, General Manager, Washington Rubber Company, Washington, Pennsylvania, says, "Switching to Micro-Black has reduced mixing time 24%. The addition of scorch retarders is unnecessary. By eliminating one mixing cycle, we can produce as much as 30% more camelback stock a day."

Washington Rubber finds another processing advantage in the greater tensile strength of Micro-Black masterbatch. "Tensile strength of milled rubber is 3600 psi compared with 3200 psi for the rubber previously used—indicating superior dispersion of carbon black—and a constant Mooney viscosity is obtained," says Mr. Malone.

HERE'S WHY AMERIPOL MICRO-BLACK GIVES SAVINGS LIKE THESE

Goodrich-Gulf's exclusive process—high liquid shear agitation—results in thorough dispersion of black throughout the latex. You get controlled uniformity. You cut your processing costs. You eliminate one complete weighing and milling operation and messy, expensive carbon black cleanup or storage.

with Goodrich-Gulf Micro-Black

"Our customers are consistently averaging 40,000 to 50,000 miles with retreaded tires on the drive wheels of truck tractors, and between 70,000 and 100,000 miles on trailer tires," says John Behan, owner of Anchor Tire Company, Pittsburgh, Pennsylvania.

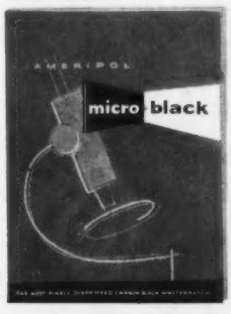
Crediting the unusually high abrasion resistance of tread rubber compounded with Ameripol Micro-Black for this longer service life, Mr. Behan says, "Despite the beating truck tires take today, tires retreaded with camelback made from Micro-Black rubber are lasting just as long as new tires and at only one-third the cost."

HOW TO PUT MICRO-BLACK TO WORK IN YOUR OPERATION

Call your Goodrich-Gulf Sales Engineer. He'll help you determine the right recipe, will put the Goodrich-Gulf Technical Laboratory at your service. Call today.

FREE

New illustrated data book gives full information on all 10 types of Ameripol Micro-Black, their properties and applications. Send for your free copy.



Goodrich-Gulf Chemicals, Inc.

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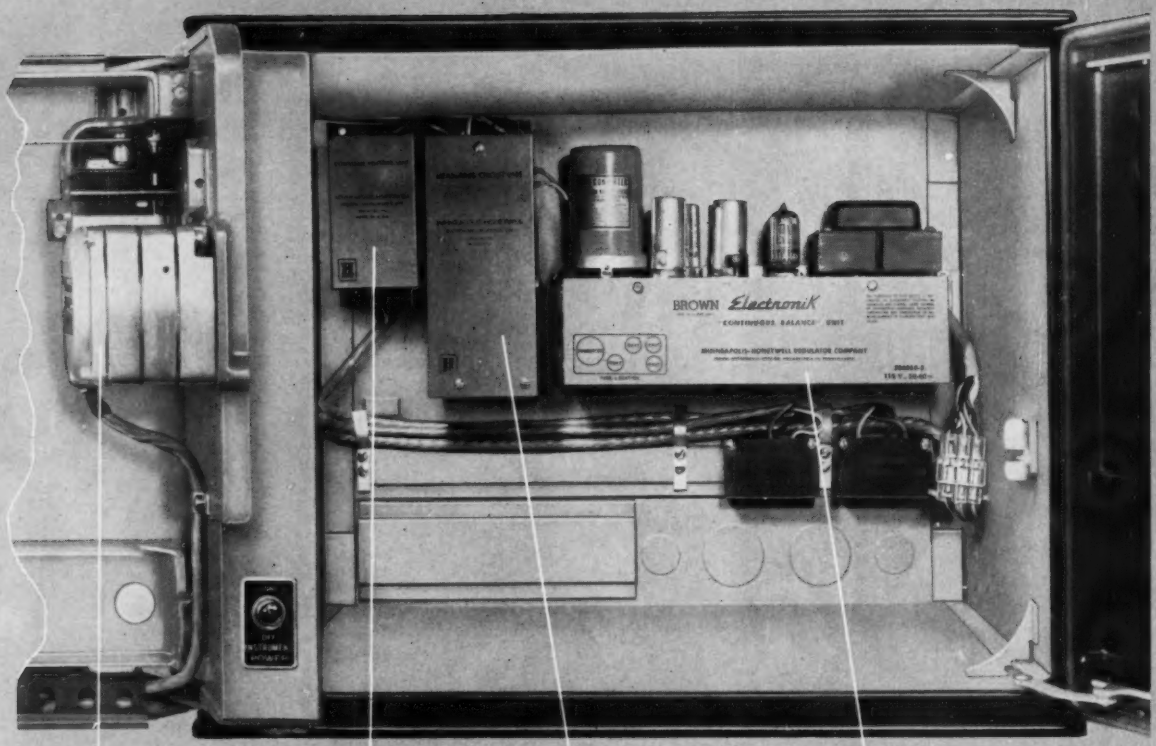
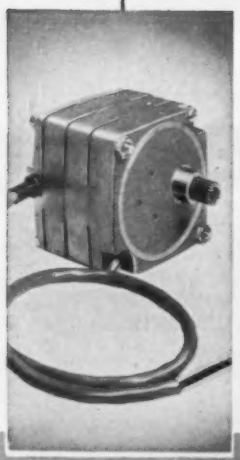
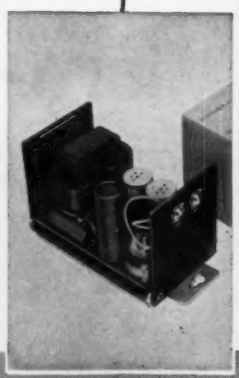
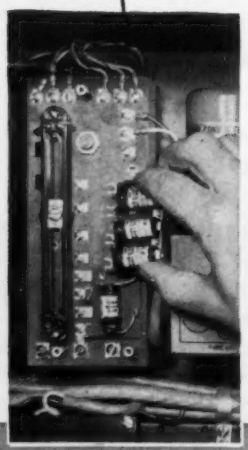




Servo Motor has sectional housing, leakproof oil wick, printed circuits for simplified servicing. Any major part can be replaced in 2 minutes.



Constant Voltage Module—Uses Zener diodes and an ambient temperature compensator to replace standardizing mechanism.



Measuring Circuit Module—Contains easily-changed range spool panels and vernier adjustment. Range is changed simply by replacing screw-clip panels of fixed resistors.

Amplifier Module—Quick-connect design permits fast, easy removal for servicing and replacement. Circle shows quick connect plug.

THESE FOUR NEW FEATURES ARE STANDARD WITH ALL *ElectroniK* POTENTIOMETERS

New modular design...

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Now, four great new features add new operating and servicing ease to all *ElectroniK* circular and strip chart potentiometers.

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- **A new constant voltage unit replaces batteries, standard cells and standardizing mechanisms.**
- **A new measuring circuit, with quick-change range spools, simplifies range changing and reduces stray pickup.**
- **A quick-connect feature lets you remove the amplifier for service and replace it quickly.**

Now, modular design is combined with the traditional precision of *ElectroniK* potentiometers, to give you a greater value than ever in accurate, dependable measurement and control.

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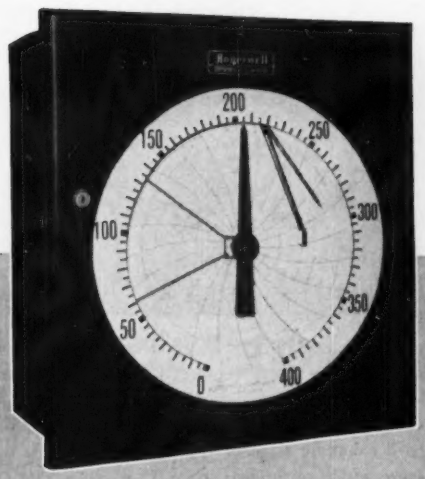
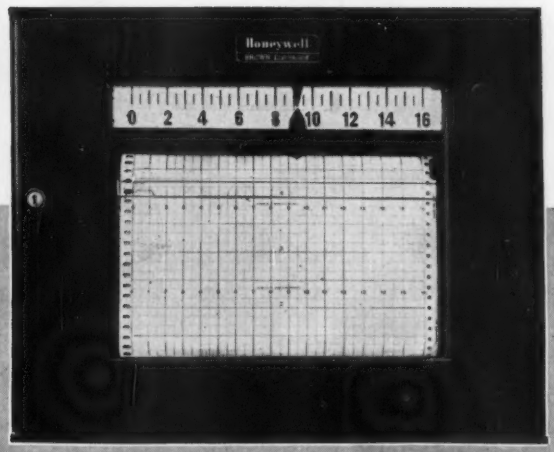




Adsorption and Lubricity Properties of **Fatty Nitrogen*** Chemicals May Improve Your Product, Too

In textile conditioners, General Mills Aliquat H226 adsorbs on fibers, making them soft and silky

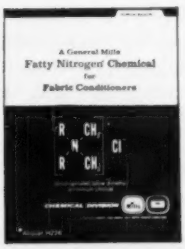
A monomolecular film has been electrochemically adsorbed on these terrycloth fibers (enlarged 80 diameters in the above photo). The cloth was treated with a textile conditioner based on one of our fatty nitrogen chemicals. These conditioners can be used to confer softness to all kinds of fabrics. In home use, they are added to the final rinse.

Imaginative chemists have discovered that premium grade textile conditioners for both home-use and commercial markets can be formulated with only a small amount of Aliquat H226. Aliquats, our trade name for quaternary ammonium chlorides, are one category of products in our complete line of fatty nitrogen chemicals.

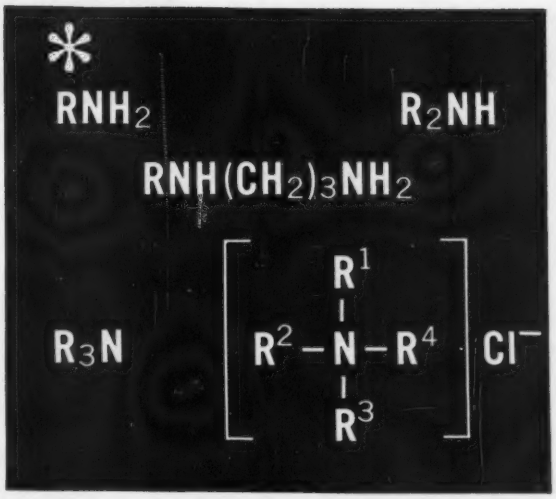
The positively charged fatty quaternary ammonium ions adsorb on the negatively charged surface of textile fibers, imparting lubricity to improve fabric body and feel, speed the rate of dry, minimize static charge, make ironing easier.

Our staff of skilled service representatives, backed by extensive research facilities, is ready to share its experience with you in fatty nitrogen chemistry. With a little imagination, chances are you can use fatty nitrogen chemicals to improve your product or process.

Unique properties of the fatty nitrogen chemicals suggest uses in many fields. They already have proven applications in petroleum additives, as ore floatation reagents, hard rubber release agents, corrosion inhibitors, bactericides and chemical intermediates—in addition to their use in textile conditioners.



WRITE FOR this new technical bulletin entitled "A General Mills Fatty Nitrogen* Chemical for Fabric Conditioners." For a copy, address: Chemical Division, General Mills, Dept. CW 213, Kankakee, Illinois.



Above left, fatty primary amine; *above right,* fatty secondary amine; *center,* fatty diamine; *lower left,* fatty tertiary amine; *lower right,* fatty quaternary ammonium chloride.

These General Mills high quality Fatty Nitrogen chemicals are reactive organic compounds, derived from fatty acids of varying molecular weights and different degrees of saturation. The alkyl chain linearity of the parent fatty acids is carried over to the Fatty Nitrogen derivatives.

These key properties make Fatty Nitrogens extremely promising in many industries:

- ☑ SURFACE FILMING—Fatty nitrogen derivatives adsorb on metal as a monomolecular film and protect the metal from corrosive environment.
- ☑ SELECTIVE ADSORPTION—Fatty amines preferentially adsorb on certain non-metallic mineral surfaces; this surface modification enables the separation of ore components.
- ☑ CHEMICAL REACTIVITY—The fatty nitrogen derivatives are unique building blocks for organic chemical synthesis.
- ☑ SOLUBILITY—The fatty nitrogen derivatives have characteristic solubilities in a wide variety of polar and non-polar solvents.
- ☑ SURFACE ACTIVITY—The fatty nitrogen derivatives are cationic emulsifiers, wetting agents and detergents.
- ☑ BIOCIDAL ACTIVITY—The fatty nitrogen derivatives inactivate certain bacteria, fungi and algae.
- ☑ LUBRICITY—Fatty nitrogen derivatives, electrochemically adsorbed on fibers and fabrics, lubricate the individual fibers and confer softness.

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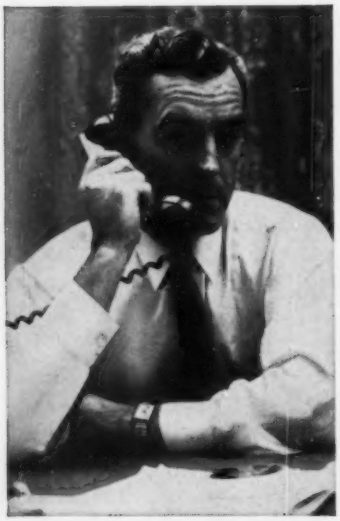
HOW *HERCULES* HELPS...

MOOR A TANKER—When the S.S. Sinclair Superflame was lashed by a hurricane while mooring, every line snapped during the storm's fury except one—an American Manufacturing Company's "Floterope," made from Hercules Pro-fax® polypropylene. Today, over a year later, that same polypropylene line is still in use aboard the Superflame—proof that Pro-fax rope can meet the marine industry's most demanding challenge. Whether it be for rope or automobile seat covers, household appliances or industrial uses, wherever a tough, rigid, versatile synthetic is needed, Pro-fax is setting new standards for accomplishment.



LAUNDER A SHIRT—Nothing makes a man feel better-dressed than a well-laundered shirt. That's why so many commercial laundries depend on Huron Starch to provide a truly professional job. In the field, Hercules-trained representatives back up the performance of the product by assisting laundries in finding solutions for technical problems.

IMPROVE INDUSTRIAL BLASTING
"The Man with The Red Valise," a familiar sight to those who use industrial explosives, is typical of Hercules service. In this kit is the complete line of Hercules blasting caps in dummy form. Using this display, the Hercules representative can familiarize the customer with the complete range of Hercules blasting devices that are available to fit various requirements.

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INCORPORATED
900 Market Street, Wilmington 99, Delaware

660-2

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

LETTERS

Three Checks for Utah

TO THE EDITOR: On page 41 of your Jan. 23 issue I note that there is an apparent error in omitting Utah as a state engaged in some form of atomic activity.

I am sure you are aware that Utah is one of the leading states in uranium mining, milling and refining. . . .

W. C. PALFREYMAN
Director
Utah Committee on Industrial & Employment Planning
Salt Lake City

These three checkmarks were missed in the execution of the chart. —ED.

Elsie's Liederkranz

TO THE EDITOR: Your article on the possibilities of using cheese as cigarette filters (*CW, Jan. 23, p. 90*) has an intriguing head "Light Up a Liederkranz." May we record the fact that Liederkranz is a registered trademark of The Borden Co.?

MILTON FAIRMAN
Assistant Vice-President
The Borden Co.
New York

And a mighty good cheese, too, with crackers, raw onions, and a bottle of ale.—ED.

Inaccurate and Unfair?

TO THE EDITOR: In your Viewpoint of Jan. 23 you list several charges that are leveled against the chemical industry, after which you say, "We consider each of these statements inaccurate and unfair. But if even a small part of the public believes any of those statements, the chemical industry has a problem." I, for one, don't accept the contention that all of them are inaccurate.

For example, despite the drug companies' arguments about the cost of research and short product life, the fact remains that their profits on the average are higher than those of other segments of the chemical industry, which in turn are higher than those in general manufacturing.

You keep advocating fluoridation. So does the U.S. Public Health Service, I know, and the American Dental Assn. and the American Medical Assn. But a lot of well-educated, responsible

VIEWPOINT

Time to Argue Free Trade

IF THE U.S. is going to solve political and economic problems that threaten to split the West, it will probably have to face up to a further lowering of tariffs—possibly something like a one-third cut in our over-all average. Individual producers are bound to be hurt, temporarily, at least. But that is a necessary sacrifice for the greater national interest.

This is one of the major themes emerging from the recent conference sponsored by the Committee for a National Trade Policy, a business-supported organization devoted to worldwide reciprocal reduction of trade barriers—in other words, "free trade."

Motives of self-interest might be attributed to many of the organization's members. But most of those participating in the conference discussions were academic economists who believe—as do most economists—that free trade would further long-run industrial efficiency and economic growth.

Their views will arouse the ire of many industrialists. Nevertheless, these views will have to be taken into account, because the men who espouse them carry great weight in the executive and legislative branches of the government.

Ironically, many of the problems with which the economists grappled result from their having successfully sold free trade in theory. But this success has been limited and the theory partly distorted in its application.

The world is not yet prepared to drop all trade barriers. (Few economists would recommend that they do.) But the worldwide trend toward "regionalization" represents an attempt to gain the benefits of free trade—expanded markets, specialization, integration, and faster economic growth—by applying the principle to a limited area.

For the moment, regionalization in Europe is causing the U.S. the greatest concern. We welcomed the six-nation "Common Market" because of its political benefits. But now we are faced with a split between the Common Market and the new seven-nation Free Trade Assn.—a split that could shatter Allied unity.

If the European nations get together in some kind of trade union that does not include the U.S., our trade balance would face a further unfavorable shift. More important, the West could be divided into two centers of power—Europe and the U.S.—thereby sapping the total effort against Communist aggression.

The economists could not predict how the problem will finally be resolved. But they generally agreed that the solution will involve more—not less—free trade. The Common Market nations are not willing to sacrifice their integration in the interests of the U.S. or of Allied unity. They are willing to extend their trade liberalizations to outside countries—but only in exchange for similar concessions.

We could attempt to balance our trade position by raising our protective barriers, as some groups are demanding. But this would ultimately result in lowering our exports, helping to depress our own economy as well as that of our allies.

Producers who would be hurt by lower tariffs, the economists believe, should adjust by increasing their efficiency or switching to new products. Those who advocate a different course must set forth their arguments reasonably and persuasively.

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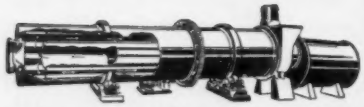
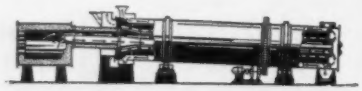
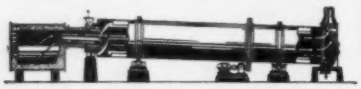


Semi-Direct Heat, Double-Shell Dryer, ideal for coal drying.

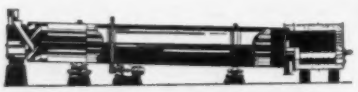


Indirect-Heat, Double-Shell Dryer for easily-contaminated materials such as kaolin, chalk, etc.

Rotary Steam Tube Dryer designed for raw chemicals.

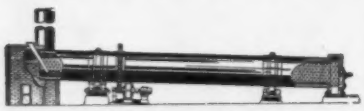


Single-Shell Dryers, parallel flow, for most organic or inorganic materials.



Single-Shell Counter-Flow Dryers for high-temperature drying.

Hot-Air Dryer for inorganic salts and similar materials.



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LETTERS

physicians and dentists are not sure that fluorides don't have subtle harmful effects when taken regularly over a long period of time.

There have been quite a few explosions of ammonium nitrate. In fact, you showed one the week before (*Jan. 16, p. 75*). But the industry fights shipping regulations that are designed to safeguard the public.

You also make three statements concerning toxicity of chemical materials. I'm glad we have the Food & Drug Administration to depend on, and not chemical manufacturers, to guard our health.

ANTHONY P. FERRIERI
Needham, Mass.

Colorful Puzzler

TO THE EDITOR: That's a strikingly colorful illustration gracing your Jan. 30 cover, but just what does it represent? The italicized blurb hints that it has something to do with the building industry; the story (*p. 52*) indicates that stained glass is gaining favor as a means of giving buildings brilliant distinction, but it does not tell me for sure that the cover picture is of stained glass. How about straightening me out?

DON BRADLEY
Consultant
Chicago

To clear up the point for Reader Bradley and others, the Jan. 30 cover picture is a section of the sanctuary window of St. Anthony's Shrine in Boston. CHEMICAL WEEK *used only a small part of the stained glass ornamentation; the full window portrays in stylized design episodes from the Bible and Roman Catholic church history.*—ED.

Sailors Take Cheer

TO THE EDITOR: The boat building industry's shift to plastic for boat hulls (*Jan. 23, p. 68*) may bring to an end one of the big pleasures of boating: readying the craft—painting, sanding, calking—for the water each spring. That's the time when the fraternal spirit and helpfulness of boaters really blossom.

EDGAR BRINKMAN
Greenwich, Conn.

Boatbuilders tell CHEMICAL WEEK *that reduced upkeep is a key sales point for plastic boats.*—ED.

MEETINGS

American Institute of Mining, Metallurgical & Petroleum Engineers, annual meeting, Statler-McAlpin Hotel, New York, Feb. 14-18.

Society of the Plastics Industry, Plastic Bottle and Tube Manufacturers Institute, Roosevelt Hotel, New Orleans, Feb. 16-17.

Chemical Market Research Assn. meeting; subject: consumer market research as an aid to chemical market research; Lord Baltimore Hotel, Baltimore, Feb. 17-18.

Chemical Institute of Canada, Protective Coatings Division conference, Toronto, Ont., Feb. 19.

American Institute of Chemical Engineers, national meeting, Biltmore Hotel, Atlanta, Ga., Feb. 21-24.

Technical Assn. of the Pulp & Paper Industry, 45th annual meeting, Commodore Hotel, New York, Feb. 22-25.

Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh, Feb. 29-March 4.

Instrument Society of America, temperature measurement symposium, Deshler-Hilton Hotel, Columbus, O., March 9-11.

American Concrete Institute, annual convention, Commodore Hotel, New York, March 14-17.

National Assn. of Corrosion Engineering, annual conference, Memorial Auditorium, Dallas, Tex., March 14-18.

Synthetic Organic Chemical Manufacturers Assn., meeting, Roosevelt Hotel, New York, March 15.

Chemurgic Council, 25th annual conference, Sheraton-Park Hotel, Washington, D. C., March 16-18.

Western Petroleum Refiners Assn., 48th annual meeting, Hilton Hotel, San Antonio, Tex., March 28-30.

Nuclear Congress, Coliseum, New York, April 3-8.

American Chemical Society, national meeting, Cleveland, April 5-14.

Lead Industries Assn., 32nd annual meeting, Chase-Park Plaza Hotel, St. Louis, Mo., April 6-7.

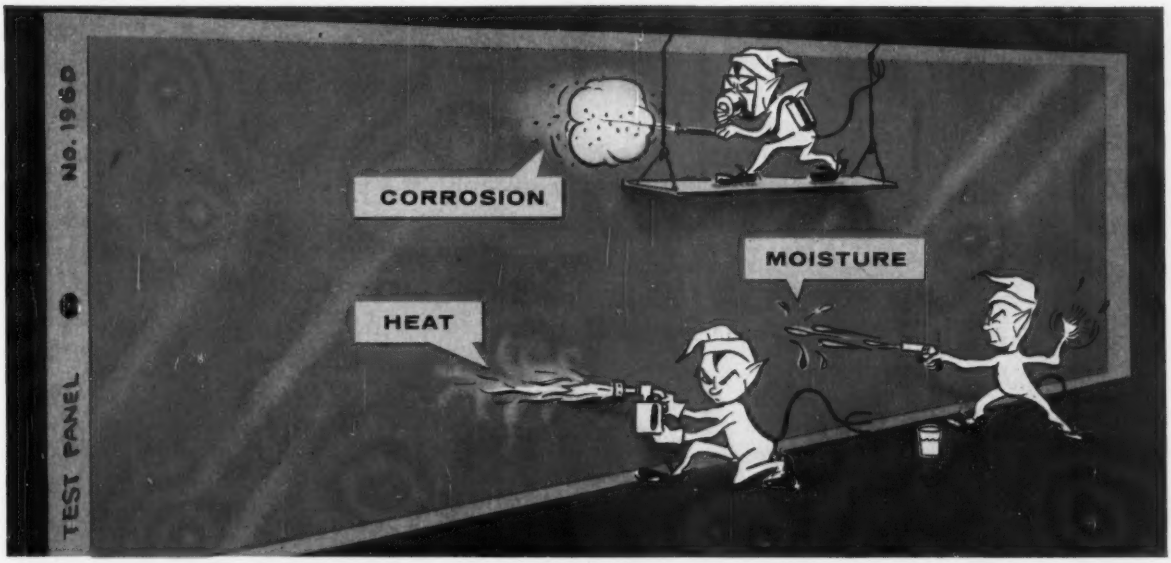
Chemical Institute of Canada, Rubber Chemistry Division, annual meeting, Kitchener, Ont., April 8.

Synthetic Organic Chemical Manufacturers Assn., meeting, Roosevelt Hotel, New York, April 12.

Second European Symposium on Chemical Reaction Engineering, Koninklijk Instituut voor de Tropen, Amsterdam, Holland, April 28-30.

Parenteral Drug Assn., Warwick Hotel, Philadelphia, April 29.

A New "Resistance" Movement



Silicone Resin Based Coatings Resist Paint's Worst Enemies!

The demand is great . . . the movement is on . . . for finishes that stand up longer, hold costs down, build greater user satisfaction. Heading the movement, and making it possible for you to add a new measure of *high performance* to your finishes, are silicone resins by Dow Corning. Which of these resins could improve the formulations you're working on right now?

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805 Resin forms flexible film with good aluminum leafing properties and stability at 1000 F plus. Metallic paints made with 805 Resin are excellent for stacks, mufflers, boilers, jet engines, exhaust manifolds, heat exchangers, other high temperature equipment.

806A Resin is a hard, nonflexible material often blended with 805 Resin in aluminum formulations to increase toughness, improve drying properties. Makes colored enamels that have excellent hardness and adhesion at service temperatures to 450 F.

808 Resin is a flexible resin that combines outstanding heat resistance with excellent gloss retention. Used in colored baking enamels for service temperatures up to 550 F. Decorative finishes based on 808 Resin have excellent adhesion, color and gloss retention and corrosion resistance. Ideal for space heaters, clothes driers, stoves and other hot appliances.

840 Resin is compatible with many organic resins. Readily blends with them to improve heat stability and weather resistance. Color and gloss retention of high temperature decorative finishes is vastly improved by blending in 840 Resin; coatings stay good looking in continuous service up to 400 F.

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Z-6018 is a low molecular weight silicone intermediate which will react with a wide variety of organic protective coating resins and monomers to improve heat stability, moisture resistance and weatherability. Reacts readily with alkyds, phenolics, epoxies, cellulosics, polyesters and other organic resinous materials containing hydroxyl groups.

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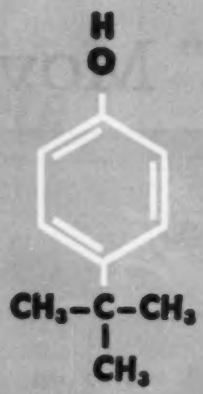

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Business Newsletter

CHEMICAL WEEK
February 13, 1960

Chemical companies are boosting capital expenditures this year, as anticipated in last fall's McGraw-Hill survey (*CW, Nov. 14, '59, p. 39*). In fact, latest company budget plans indicate that the chemical industry's '60 capital spending may exceed $1.5 billion—25% over '59 outlays—projected last fall.

• Hercules Powder Co. has planned what it terms an all-time high in capital expenditures for '60: $43 million, compared with the company's previous peak of $34.5 million in '56. Original plans called for almost $49 million in approved projects for expansion, but last fall's steel strike is expected to limit this year's actual construction work.

Hercules' three major projects: a new polypropylene facility at Lake Charles, La. (capacity 50 million lbs./year), to start up in early '61; tripling of dimethyl terephthalate facilities at Burlington, N.J.; and the West Coast's first methanol plant for Hercules, Calif. Another project is construction of a Penton (chlorinated polyether) resin plant at Parlin, N.J., scheduled for completion this year.

• Allied Chemical this year will more than double its capital spending. The '60 outlay will be about $86 million, compared with $40 million in '59. The company plans to triple Caprolan (nylon-6) yarn production, will expand "substantially" its caprolactam capacity.

• Hooker Chemical Corp., which spent about $71 million for expansion of productive capacity and improvement of existing facilities from '54 through '58, has embarked on an even more ambitious program for '59-'63—$100 million. During the next two years it will spend $10 million in expanding its chlorine-caustic soda capacity (*CW Business Newsletter, Feb. 6*); it also plans substantial expansions in synthetic resins and molding compounds, new chemicals and plastics.

•

Nylon's drive into the tire-cord market continues to gain. Now Chemstrand Corp. is planning to expand by 50% its capacity for production of nylon-6,6 tire and carpet yarns. Forthcoming expansions by nylon producers, according to Chemstrand President Edward O'Neil, "will assure . . . a supply of nylon tire yarn adequate to meet total demand of the tire industry."

Chemstrand's expansion plan comes on the heels of Dow's decision to start construction next month of a nylon-6 tire-cord plant near Williamsburg, Va., for its James River Division (*CW Business Newsletter, Feb. 6*).

•

Synthetic-natural rubber production outlook is in sharper focus this week.

Goodrich-Gulf Chemicals (Cleveland) is nearing commercial production of two products: Ameripol SN (polyisoprene) and Ameripol

CB (*cis*-polybutadiene). Advanced engineering is now in progress. A proposed 25,000-tons/year plant could be in operation by late '61. Plant sites under consideration are in Orange County, Texas, and Institute, W. Va.

Engineering has been approved for Firestone's Coral and Diene Orange, Tex., rubber plant. Firestone is hopeful that the plant will be onstream late this year (*see also Market Newsletter, p. 85*).

•

Another step toward building up Latin American industry—thereby spurring the area's chemical growth—is being taken this week in San Salvador. Governors of the projected Inter-American Development Bank are readying plans for a $1-billion lending institution, which will collaborate with private capital in development projects. Venezuela and Uruguay still have not ratified the bank agreement.

Cuba will stay out of the plan, believing that the bank will be dominated by U.S. capital. At the same time, National Bank President Ernesto Guevara laid down Cuba's policy toward foreign investments: Cuba doesn't want any, unless they are "regulated." The government will hold 51-100% control of all "basic" industries, including industrial chemicals, metals, oil and gas, cane by-products, and all food products.

•

Intensifying pressure on profits is seen in financial data out early this week.

Stepan Chemical (Chicago) boosted yearly sales 45.1%, largely through acquisition of Maywood Chemical and Ris-Van fertilizers; '59 sales—including Maywood and Ris-Van business—were $20.8 million. But consolidated net income of $943,279 was up just 16.3% from the $881,044 Stepan chalked up in '58, before the mergers.

Pan American Sulphur also set a new sales record last year, but saw earnings take a dip. Sales increased 3.2%, to $17.9 million; but net income slipped 3.1%, to $3.5 million. A major factor, of course, was last year's industry-wide sulfur price cut.

Bunker Hill Co. (San Francisco)—basically a producer of nonferrous metals but now actively diversifying into chemicals—operated in the red during the second and third quarters of '59. But a fourth-quarter profit of $499,314 was enough to offset the earlier losses and leave a net gain of $322,458 for the year.

•

But over-all, chemical business was good in '59—both in the U.S. (*see p. 20*) and in other countries. Three leading Canadian companies all report good gains: Canadian Industries Ltd., sales up 5.8%, to $149 million, earnings up 20.8%, to $6.2 million; Du Pont of Canada, sales up 11.3%, to $90.9 million, earnings up 36.9%, to $7.2 million; and Canadian Chemical Co.'s earnings climbed from $771,000 in '58 to $3.3 million. And Germany's Farbwerke Hoechst boosted sales 17.6%, to $528.6 million.

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Chemical Week — February 13, 1960

Shaping Up: Another Great Year

For chemical process companies, the business upsurge is still going strong. Last year brought a 10%-plus increase in total sales and a rise of more than 20% in earnings—despite the 116-day steel strike. The trend is now expected to hold its course through '60, making this the biggest year yet for nearly all CPI segments.

But '61 may tell a different story. Some people feel that inventories will get too big, capital spending will dip, and the upsurge will have run out of steam. President Peter Hoguet of The Econometric Institute (New York) goes so far as to predict that a cyclical slump similar to the '57-'58 recession in nature and severity will begin in last-half '61.

Barometers Rising: But other leading economists can't go along with such a prediction. They contend there just aren't any indexes on which to base a general economic forecast of more than 12 months. Still pointing upward, they say, are some indexes with implications for business activity as much as eight to 12 months in the future. Case in point: new orders for machine tools.

Meanwhile, latest corporate financial data (*table, p. 21*) reveal sweeping gains in '59 for producers of industrial chemicals. Their sales and earnings rose well over prerecession '57 levels. And the uptrend was even more buoyant than was expected. It continued right through the steel strike and its aftermath.

Pharmaceutical companies, too, generally achieved record sales and earnings last year. And most other CPI companies maintained a swift sales pace.

Not Stalled by Strike: When the July-to-November steel strike finally forced auto plant shutdowns, speculation was rife concerning the likely damage to chemical companies' second-half sales. But returns from 15 leading producers of industrial chemicals (*top table, p. 21*) indicate that most guesses were badly off key.

Collectively, these companies' sales —which had vaulted 9.7% from second-half '58 to first-half '59—rose again during last year's strike-marred second half. In all, their second-half sales were up 10.6%, to $2,669 million, compared with $2,416.4 million in the last six months of '58—a period of economic recovery.

Some chemical companies' sales fell off, however, in the third and fourth quarters. Allied Chemical's fourth-quarter volume—though 7% higher than in the corresponding three-month period of '58—was down 15% from the company's second-quarter peak; and net income, a spokesman adds, "was affected substantially by shortage of coal chemical raw materials usually obtained from the steel industry." Monsanto's second-half sales — although up more than 6% from last-half '58—were down nearly 5% from first-half '59.

But for the industry as a whole, these setbacks were more than balanced by such second-half gains as Dow Chemical's $30-million advance. Biggest eye-opener so far in this connection: Union Carbide's $11-million sales rise during the latter half of '59 (*CW Business Newsletter, Feb. 6*). Because Carbide is a prime supplier of chemicals, gases and alloys to the steel industry, some observers were expecting the company's fourth-quarter sales to drop below $380 million—despite the seasonal surge in antifreeze business. Actual fourth-quarter sales: $410 million—the company's highest quarterly total to date. Carbide credits this happy circumstance partly to the steel industry's rapid resumption of production during November and early December and partly to improving business in most other product areas.

Managers Optimistic: CPI executives cite diverse reasons for their near-unanimous confidence that '60 will be an even better year than '59. Most, of course, would agree with Diamond Alkali Chairman and President R. F. Evans that the outlook for '60 is favorable because of generally improved economic conditions.

Sample comments:

President Fred Foy of Koppers Co. expects "much improvement" in '60 —in part because of the upturn in industrial construction. His company's engineering and construction division now has a backlog of $143 million in plant contracts, compared with $65 million one year ago.

Carbide Chairman Morse Dial says '60's outlook is for "continued improvement in sales and earnings."

Chairman Howard Kellogg, Jr., of Spencer Kellogg & Sons, reasons that the higher level of general business should call for greater volume of soybean oil for the margarine market; and rising industrial expansion should result in increased use of both linseed and soybean oils. But the fall-off in residential construction could cut into linseed oil consumption in paints, and "the bleak farm picture may hold down sales of soybean meal and manufactured feeds."

Among integrated oil companies, one of the biggest gains last year was the 23% increase in net income posted by Phillips Petroleum, which attributes a considerable part of that rise to increased chemical sales. This year, according to Chairman K. S. Adams, "benefits of the company's diversification" will be reflected in still higher earnings.

Best current estimate of total '59 sales of chemicals and allied products: about $25.8 billion—up 11% from '58. Top company executives are predicting that this total will be up another 5-10% this year, that earnings will climb 10-20%. And, '61 aside, even recession-forecasting Hoguet is predicting a hefty long-term gain for the chemical industry —$42 billion in sales by '70.

STRONG FINISH FOR 1959 SALES AND EARNINGS

(Dollar figures in millions)

	SALES					EARNINGS		MARGINS	
	2nd half '58	1st half '59	2nd half '59	1959 Total	Change from '58	1959 Total	Change from '58	1958	1959
Air Reduction	89.6	101.8	98.8	200.6*	Up 14.4%	14.8	Up 11.2%	7.6%	7.4%
Allied Chemical	320.3	372.5	347.2	719.7*	Up 13.2%	50.0	Up 46.2%	5.4%	7.0%
Atlas Powder	33.8	35.0	35.7	70.7	Up 7.8%	3.9	Up 35.9%	4.4%	5.5%
Diamond Alkali	57.8	65.9	72.0	137.9*	Up 20.7%	11.3*	Up 75.0%	5.7%	8.2%
Dow Chemical(1)	341.9	363.5	393.7	757.2*	Up 18.1%	80.0*	Up 77.3%	7.0%	10.6%
Harshaw Chemical(2)	30.1	36.5	35.6	72.0	Up 24.1%	2.0	Up 44.4%	2.4%	2.7%
Hercules Powder	119.7	137.2	146.4	283.6*	Up 19.9%	23.4*	Up 33.6%	7.4%	8.2%
Heyden Newport	25.1	27.8	28.2	56.0*	Up 16.9%	2.8*	Up 64.7%	3.5%	5.0%
Hooker Chemical(3)	65.3	74.7	75.1	149.8*	Up 19.3%	13.4*	Up 26.0%	8.5%	8.9%
Koppers Corp.	128.4	113.8	126.5	240.3	Down 7.2%	5.4	Down 8.3%	2.3%	2.2%
Monsanto(4)	282.9	314.9	300.4	615.4*	Up 12.3%	49.0*	Up 41.8%	6.3%	8.0%
Nopco Chemical	14.8	17.9	19.4	37.3*	Up 27.4%	2.3*	Up 29.3%	6.0%	6.1%
Rohm & Haas	93.1	109.4	106.5	215.9*	Up 22.3%	23.2*	Up 46.7%	8.9%	10.7%
Stauffer Chemical(5)	106.2	117.2	112.3	229.5*	Up 8.3%	22.2*	Up 23.3%	8.5%	9.7%
Union Carbide	707.6	760.1	771.2	1,531.3*	Up 18.1%	171.6*	Up 37.4%	9.6%	11.2%

PHARMACEUTICAL	1959 Total	Change from '58	1959 Total	Change from '58	1958	1959
Baxter Laboratories	29.5*	Up 18%	1.8*	Up 30%	5.6%	6.1%
Bristol-Myers	——	——	8.9*	Up 22.8%	6.4%	——
Carter Products(6)	44.3*	Up 26.3%	7.3*	Up 40.7%	14.8%	16.5%
Lilly, Eli	187.0	Up 3.6%	23.4	Down 1.0%	13.1%	12.5%
Smith Kline & French	134.9*	Up 8.7%	25.0*	Up 20.3%	16.8%	18.6%
Vick Chemical(7)	68.8	Up 13.0%	8.4	Up 15.0%	12.1%	12.3%

OTHER CPI	1959 Total	Change from '58	1959 Total	Change from '58	1958	1959
Alcoa	858.5	Up 14.0%	55.6	Up 29.6%	5.7%	6.5%
American Ag.(7)	——	——	—0.2	——	——	——
American Viscose	239.8	Up 10.5%	15.2	Up 119.2%	3.2%	6.4%
Catalin Corp.(8)	22.3	Up 7.1%	0.1	Down 34.3%	0.1%	0.1%
Ferro Corp.	63.8*	Up 13.2%	3.3*	Up 67.7%	3.5%	5.2%
Foster Grant(9)	29.3*	Up 27.9%	1.7*	Up 71.5%	4.4%	5.9%
Freeport Sulphur	——	——	14.5*	Up 10.6%	——	——
International Minerals(7)	47.7	Up 9.2%	1.7	Up 146.4%	1.6%	3.6%
Kaiser Aluminum	435.6*	Up 6.6%	22.3	Down 11.5%	6.2%	5.1%
McKesson & Robbins(6)	508.5*	Up 8.1%	8.8	Up 11.3%	1.7%	1.7%
National Distillers	575.6*	Up 9.8%	25.1	Up 24.7%	3.8%	4.4%
National Starch	52.8*	Up 14.2%	3.3*	Up 6.6%	6.8%	6.3%
Procter & Gamble(7)	——	——	53.0	Up 22.8%	——	——
Rayonier	129.5	Up 19.9%	13.4	Up 270.8%	3.3%	10.3%
Spencer Chemical(7)	24.5	Up 2.7%	1.8	Up 28.5%	5.8%	7.2%
U. S. Borax(10)	15.7	Up 8.1%	1.5	Up 33.3%	7.5%	9.3%

* Company's highest total to date. (1) Computed for 12 months ended Nov. 30, instead of for fiscal year ended May 31. (2) Computed for 12 months ended Dec. 31, instead of for fiscal year ended Sept. 30. (3) For fiscal year ended Nov. 30. (4) U.S. and Canadian operations only. (5) Including operations of Victor Chemical Works, merged Nov. '59. (6) For nine months ended Dec. 31. (7) For six months ended Dec. 31. (8) Net income for '59 before deduction for net loss on sale of obsolete equipment. (9) For fiscal year ended Sept. 27. (10) For three months ended Dec. 31.

Boosting the Merger Tally

Mergers and acquisitions continue unabated. Seven new plans are in the works this week.

(1) Union Oil & Gas Corp. (Houston, Tex.) and Texas Natural Gasoline (Tulsa, Okla.) have entered into a merger agreement that would sire a new, $250-million company.

Expansion into petrochemicals is one of the principal growth possibilities now under study. Union is primarily an oil and gas producing company with interests in the Gulf Coast area, Canada, Venezuela, Bolivia and Argentina. Texas Natural Gasoline's operations are mainly construction and operation of plants to extract and liquefy petroleum gas. It is also involved in transportation and marketing of these products.

The plan will be submitted for stockholders' approval March 3. Under the agreement eight shares of Texas Natural Gasoline stock will be traded for nine shares of the new company. Union stockholders will retain their stock. The new company will have a total of 7,043,741 shares of capital stock outstanding. The two companies' consolidated cash income for 1959 is estimated at $34 million (excluding deductions for capital and exploration expenses).

(2) Lockheed Aircraft Corp. (Burbank, Calif.) plans to acquire 50% interest in the Grand Central Rocket Co. (Redlands, Calif.). Grand Central is working on a special propellent for the Nike Zeus antimissile program. It's also reported to be developing an escape rocket for Project Mercury — this nation's program to put man in space.

No terms of the agreement were disclosed except that Lockheed will pay cash for the common stock it acquires. Grand Central Rocket is a subsidiary of Petro-Tex Chemical Corp. (Houston, Tex.), which will share ownership with Lockheed. This will put Lockheed into partnership with Food Machinery and Chemical and Tennessee Gas Transmission Co., 50-50 owners of Petro-Tex.

(3) Stockholders of Dewey Portland Cement Co. will vote this month on a proposal to join with American-Marietta. Total cement production capacity of the merged firms would be 22 million bbls./year, when Dewey's third plant, now under construction near Tulsa, is completed later this year. The agreement is based on a ratio of 8¼ A-M common shares for each 10 shares of Dewey. And additional American-Marietta expansions and diversifications appear to be in the cards. Stockholders have voted to increase authorized common shares from 15 million to 25 million, preferred shares from 284,622 to 500,000.

(4) The boards of directors of Hercules Powder Co. and Imperial Color, Chemical and Paper Corp. (Glens Falls, N.Y.) have approved a formal agreement for acquisition of Imperial's business and assets by Hercules (*CW Business Newsletter, Jan. 16*). Imperial, which showed a net income of about $1.9 million last year on sales of about $27 million, has plants in Glens Falls and Plattsburgh, N.Y.

Under the proposed agreement, Imperial stockholders would receive one share of Hercules $2-cumulative-convertible Class A stock for two shares of Imperial capital stock. For the first 60 days after issuance, each of these Hercules shares would be convertible into nine-tenths of a share of Hercules common, and thereafter into eight-tenths of a share.

Hercules recently purchased Nitroform Agricultural Chemical Co. (Woonsocket, R.I.) — producer of urea-formaldehyde fertilizer compounds. Hercules will expand production of these materials, market them under the tradename Hercules-Nitroform Powder Blue. A new plant is slated for Hercules, Calif., next year.

(5) On the West Coast, Dyna-Therm Chemical Corp. (Culver City, Calif.) has sold 200,000 shares of common stock to help finance the now-completed acquisition of Plas-Kem Corp. (Burbank, Calif.). The two California companies will pool know-how on flame-resistant coatings, and step up research activities. Dyna-Therm plans to purchase new equipment with funds remaining from its public offering.

Plas-Kem, organized in 1950, has developed several plastisol and organosol fabric-coating formulations. A producer and marketer of polyvinyl acetate emulsion paints, the company is said to have a new construction coating that combines stucco and vinyl. Dyna-Therm has specialized in heat-resistant coatings for military and industrial uses.

(6) Celanese Corp. of America is expanding further into the plastics bottle business. The company's wholly owned subsidiary, Chemcel Ltd., is seeking to acquire an interest in Polybottle Ltd. (Toronto, Ont.), manufacturer of blow-molded plastic containers. Celanese recently acquired Royal Manufacturing Co., Inc. (Prescott, Ariz.), blow-molder of plastic containers for bleaches, detergents, etc.

(7) Revlon (New York) has just acquired its second proprietary drug organization, is considering additional acquisitions in the pharmaceutical field. Latest acquisitions: Pinex Co. (Fort Wayne, Ind.) and Pinex Co. Canada (Toronto), producers of cough syrup, cough tablets and other proprietary drugs. Earlier this year, Revlon took over Asthmanefrin Co. (Portland, Ore.), producer of inhalants for relief of bronchial asthma.

Chemical Diplomacy

West Germany plans to use its chemical know-how, plus government and private capital, to increase its influence in underdeveloped countries, particularly in South Asia.

In the Philippines, for example, German chemical technology will form the core of what is said to be the first tangible evidence of the Filipino government's efforts to increase industrialization. Filipino industrial development has been slowed by an economic austerity program and by the reluctance of foreigners to invest. Some have been frightened off by reports of extreme nationalism.

Under a provisional agreement signed in Manila last week, Germany will give the Philippine government an industrial chemical pilot plant to be used in training Filipino technicians. Products of this unit will include artificial fibers, resins, detergents, and derivatives of coconut and sugar cane wastes.

Germany will also provide laboratory equipment and a technical library. German technicians will run the plant while the Filipinos are being trained. German research institutions will cooperate in the training program. The agreement is subject to ratification in both countries.

India's Fund Hunt

India, its hopes buoyed by President Eisenhower's decision last week to boost U.S. aid by at least 50%, is pressing ahead with its chemical industry development. It is now seeking U.S. private capital to add to the promised government funds.

Latest bid for the private capital is being made by a group headed by M. Ct. Muthiah, which plans a 20,000-tons/year sulfuric acid plant and a 50,000-tons/year superphosphate plant. These units, to cost an estimated $735,000, would be operated by a new company, Madras Fertilizers, Ltd. Operating costs, including the raw materials, which would have to be imported, are estimated at about $1 million/year, and yearly output would be worth about $2 million.

In another newly proposed venture, Ramnath Shriram Somani, an Indian wholesaler, is seeking a U.S. collaborator to supply machinery for a 7-tons/day paper plant. It would use locally grown grass as raw material.

Meanwhile, the Indian government's plans to build five $50-million fertilizer plants are attracting the interest of U.S. companies. At the government's invitation, Chemical Construction Co. (New York) is preparing bids on two nitrogen fertilizer plants, in competition with firms such as Italy's Montecatini and Ansaldo, and England's Costain-John Brown. These would be operated at Trombay by the government's Hindustan Chemical & Fertilizer Co.

Snag for Drugmakers: But for some U.S. companies, the kindling interest in India may be snuffed out by a current battle between two U.S. firms and the government-owned Hindustan Antibiotics Co. The government company is trying to force Pfizer and American Cyanamid, which now have manufacturing interests in India, to license its use of some 10 patents on antibiotic production. Hindustan claims the U.S. companies are asking excessively high royalties. The government at New Delhi is mediating the dispute.

Meanwhile, a combine of three West German producers (Bayer, BASF, and Hoechst) are wrapping up negotiations with the Indian government to provide know-how for an organic intermediates plant.

Sinclair's Spencer, Koppers' Foy join forces for new styrene project.

Styrene Set for a Spurt

A more than 40% increase in U.S. styrene capacity by mid-1961 is in prospect this week. The present total —about 1.5 billion lbs./year—will rise to fully 2.1 billion lbs./year within the next 18-20 months if producers carry out these currently planned expansion projects:

Koppers Co. and Sinclair Oil Corp. are setting up a joint subsidiary, Sinclair-Koppers Chemical Co., to build and operate a 70-million-lbs./year styrene monomer plant near Houston, Tex. Koppers President Fred Foy and Sinclair Chairman P. C. Spencer say construction will begin "immediately."

Dow Chemical—styrene pioneer and principal producer—says it will increase its styrene capacity to more than 800 million lbs./year. This expansion—at both Freeport, Tex., and Midland, Mich.—would be a 60% boost in Dow's styrene monomer capacity, estimated at slightly more than 500 million lbs./year. Completion of this two-plant project is expected by late '60 or early '61.

Monsanto Chemical says it still intends to build two new styrene monomer units somewhere along the Texas Gulf Coast, within the next year and a half (*CW Business Newsletter, Nov. 21, '59*). These two units would raise Monsanto's styrene capacity by 50%, to at least 600 million lbs./year.

Cosden Petroleum—now coming under the wing of W. R. Grace & Co.—this year is tripling its styrene capacity at Big Spring, Tex., to a total of 60 million lbs./year (*CW Business Newsletter, Feb. 6*).

Foster Grant Co. is already expanding its facilities at Baton Rouge, La., for both styrene and polystyrene.

Eye on Ethylbenzene: The Sinclair-Koppers plant will be located on the Houston Ship Channel, adjoining Sinclair's Houston refinery. The latter will supply the aromatic-hydrocarbon stream for the new plant's feedstock.

To produce ethylbenzene at Port Arthur, Koppers has been buying ethylene from Gulf Oil's nearby refinery and shipping in its own, as well as some purchased, benzene. Koppers then ships the ethylbenzene to Kobuta, Pa., to be dehydrogenated to styrene. The company is the third largest U.S. styrene producer.

The new venture, Koppers says, will not affect the company's present operations; it's termed a more economical way to obtain ethylbenzene for the growing styrene market. Other producers agree that the market is growing fast; present plants are operating at more than 90% of capacity. Most producers feel the projected 600-million-lbs. increase in total U.S. capacity by late '61 is not out of line.

COMPANIES

Butte Copper and Zinc Co. (Portland, Me.) will transfer its property and assets to Jonathan Logan, New York dress manufacturer. Stockholders approved dissolving of the company in exchange for 600,000 shares of Logan's common. Also approved: sales of the company's mining assets in Montana and settlement of its operating agreements with The Anaconda Co. for $1.3 million. Settlement included Butte's assets acquired by Logan.

•

Oregon Metallurgical Corp. (Portland, Ore.) reports its high-purity reactive metals plant is "back to normal" after a $250,000 fire Jan. 31. Research and development equipment was also wrecked by the fire, but reconstruction has begun; completion is expected within a month.

•

Horkey Moore Associates (Torrance, Calif.) has formed a plastics division, devoted to extending use of reinforced-plastics technology in missiles, aircraft and space vehicles, and in civilian products.

•

Rexall Drug and Chemical Co. (Los Angeles) has created a new chemical division to be headed by Ralph M. Knight, formerly vice-president and polyethylene manager for National Distillers and Chemical Corp. Assisting Knight as vice-president: John R. Provo, formerly Du Pont's polyethylene division superintendent.

EXPANSION

Glass Containers: Knox Glass, Inc. (Knox, Pa.), will build a 200-tons/day containers plant near Forest Park, Ga., plans to be in production late this year. The fully automated plant, designed for future expansion, is initially to have two furnaces; output will include flint (plain) glass and amber glass.

•

Barium, Strontium Compounds: Barium and Chemicals, Inc. (Willoughby, O.), has purchased a one-story plant at Steubenville, O., to boost output of high-purity barium and strontium compounds.

•

Carbon Black: Godfrey L. Cabot, Inc. (Boston, Mass.), is adding 110 million lbs./year capacity to its oil furnace blacks production in a modification expansion program at four of its Southwestern carbon black plants.

•

Refractories: H. K. Porter Co. Inc. (Pittsburgh, Pa.) will spend $4 million for new construction and modernization of Refractories Division plants at Bessemer, Ala., and Wellsville, O. At Bessemer, about $2 million will be spent for a new factory, storage facilities, tunnel kiln, dryers and new brickmaking units. At Wellsville (McLain Works), $1.5 million will go for two tunnel kilns and other equipment. An estimated $455,000 expenditure is slated for a new mechanized clay mine to be opened in fall of '60, at the McClain Works.

•

Foam Products: Crown Rubber Co. (Fremont, O.) will build a new plant north of Fremont to quadruple production of foam products. The company says know-how purchased from Europe will permit it to handle 13-ft. material "with the fastest throughput rate in the U.S."

•

Chlorine-Caustic: Stauffer Chemical Co. is expanding its Henderson, Nev., chlorine-caustic plant by 25%.

FOREIGN

Carbon Bisulfide/Germany: Latest of a rash of "Common Market" joint ventures is Carbosuf, a subsidiary formed by two West German firms to build a 52,000-tons/year carbon bisulfide plant at Cologne. Partners: Glanzstoff Courtaulds (Cologne) and Dr. Jacob, Chemische Fabrik (Bad Kreuznach). The process is licensed from Food Machinery and Chemical. Raw material will come from local petrochemical plants.

•

Petrochemicals/Japan: Standard-Vacuum's subsidiary, Toa Nenryo Kogyo, has asked government approval of a plan to set up a new petrochemical subsidiary at Kawasaki, Japan's fast-growing petrochemical center. The new company hopes to produce 10,000 tons/year each of polypropylene and octanol derivatives.

•

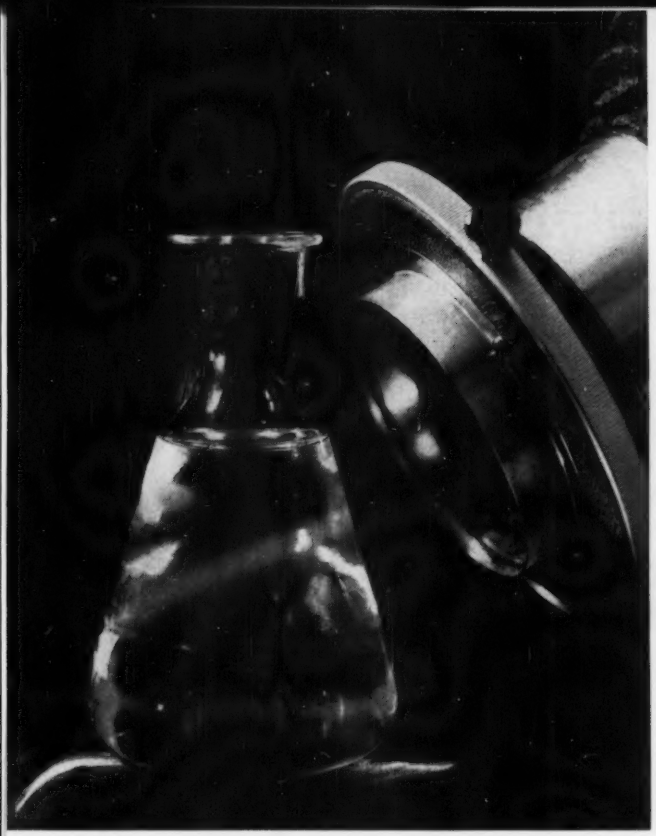
Polystyrene/Italy: Dow has formed another European subsidiary, Dow Chimica Italiana S.p.A. It will open a sales office in Milan next month and will eventually build "a multimillion-dollar manufacturing plant" at a still-undetermined site. A number of products are being considered for production, including Dow's entire polystyrene line.

•

Synthetic Rubber, Carbon Black/Argentina: Texas Butadiene and Chemical Corp. has finally concluded its negotiations with the government and will get started on its $39-million synthetic rubber and carbon black plant, to go up at Puerto Desado.

•

Aluminum/Venezuela: Reynolds Metals Co. has reached a tentative agreement with the Venezuelan government to build an aluminum reduction plant. The deal, however, must buck stiff nationalistic opposition in the Venezuelan legislature before it can be approved. The plant would use imported bauxite; power would come from the government's hydroelectric plant being built on the Caroni River.



NEVILLE 2-50-W HI-FLASH SOLVENT—CLEAR. In this completely unretouched photograph, Tyndall effect is shown on an alkyd solution reduced by Neville 2-50-W Hi-Flash Solvent. Notice there is little light trace from the parallel beam of the collimator lamp, indicating a high degree of solvency.

"AROMATIC X"—CLOUDY. In this photograph (also unretouched) the same beam from the same lamp was used, but another "aromatic" solvent replaced Neville 2-50-W Hi-Flash in the alkyd solution. The strong light diffusion shown by the larger undissolved Micelle particles indicates a much lesser degree of solvency.

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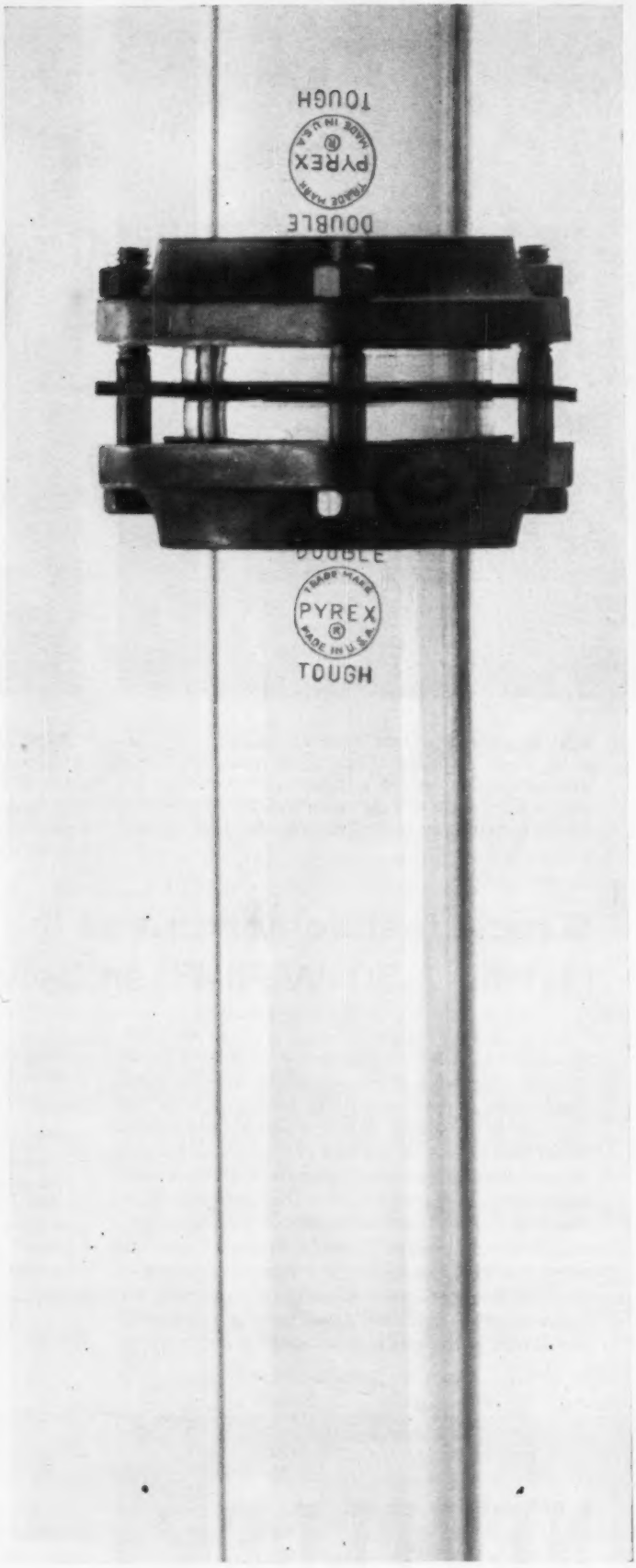

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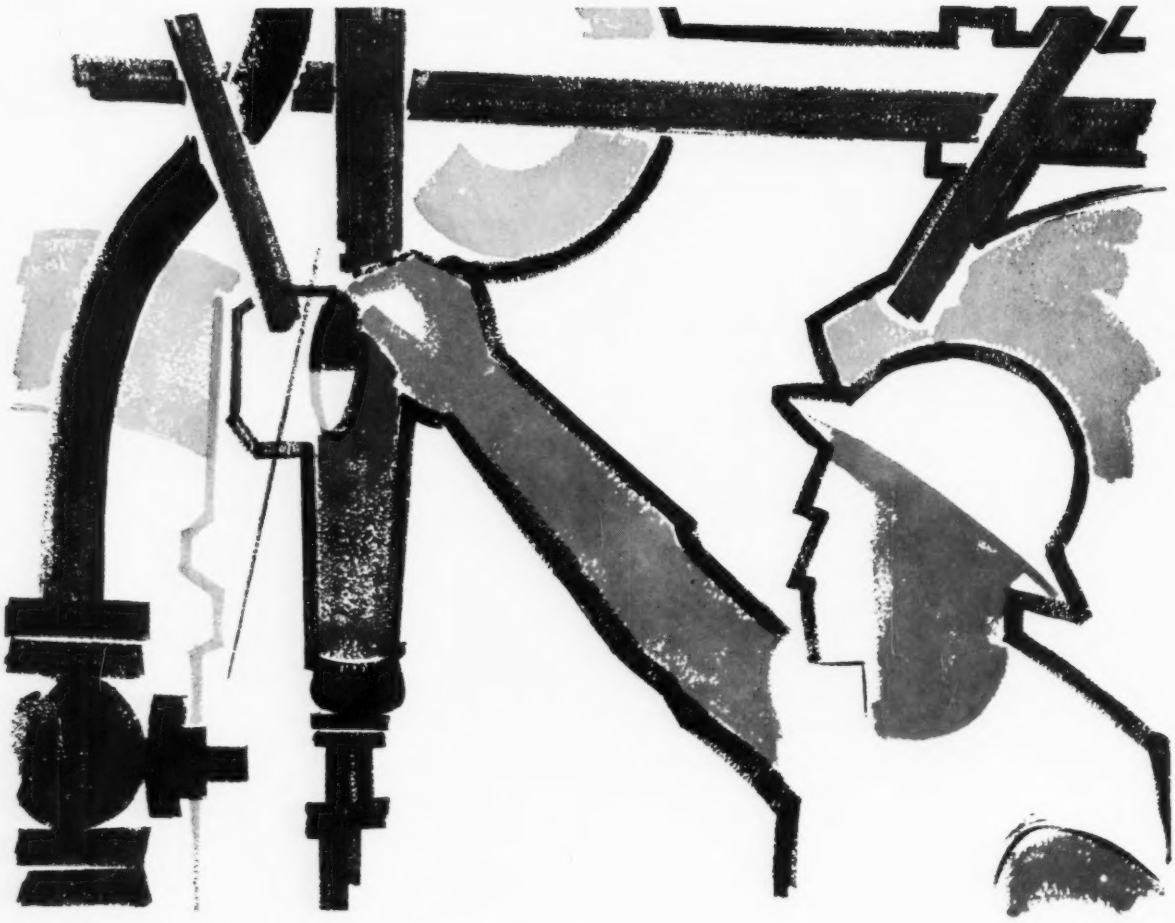

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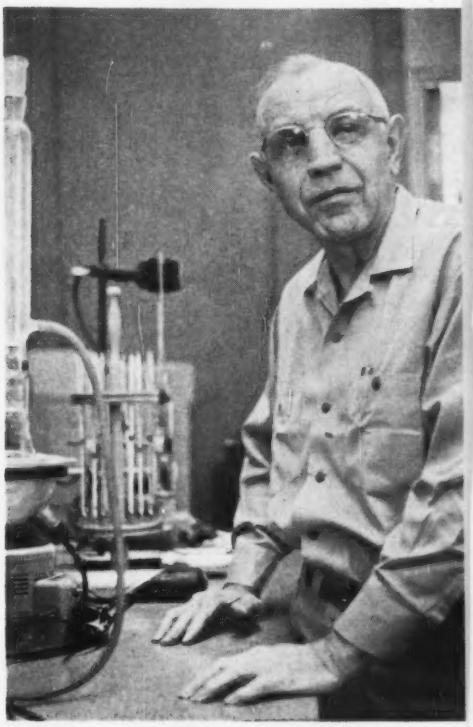
Monsanto's Hochwalt ties scientist opportunities to lab growth.



Chemist Beaver probes soap bacteriostats, was formerly research director.

Phosphorus expert Van Wazer is also rheologist, prolific scientific author.

No Conflict with Creativity

In research, as in other corporate functions, growth brings specialization; and specialization puts a premium on management ability—often to the disadvantage of the very valuable creative man who harbors no executive aspirations. Monsanto has neatly resolved this conflict with its "key scientist and technologist advancement plan," which just passed a milestone: 10 years of operation.

Monsanto's decade-long experiment holds meaningful lessons for growing companies — large and small — throughout the chemical process industries. It acknowledges the value of strictly scientific contributions. It provides "a program to ensure opportunity for advancement to personnel who qualify and who wish to follow a scientific or technological (engineering) career, compared with the alternative administrative line of promotion."

Kindred sentiment, of course, is behind similar plans of U.S. Rubber, American Cyanamid, Dow, Eastman Kodak, Hercules Powder, Minnesota Mining, Esso, Continental Oil, and other companies. But Monsanto has found there's a lot more to making its plan work than appears in the

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Picking Candidates: For one thing, it has had to be highly finicky about picking researchers for its elite corps —to prevent the program from developing into a refuge for incompetents, a way to kick people upstairs. Monsanto has 2,600 technical men, 870 in research. The plan is open to all; but there are only five senior scientists and two senior technologists in the program.

Carroll Hochwalt, Monsanto's vice-president of research, development and engineering, reveals that one of the members suggested that publication of a certain number of papers be required to maintain membership, or that a periodic examination be given. But the majority believed this limited the freedom of activity intended in the plan.

No common personality denominator, no "lone wolf" researchers have turned up in the Monsanto group. Their help is often sought by others in the company, and the key men often confer.

Hochwalt is intent on keeping the program from being watered down —he wants to keep it highly selective, consequently rewarding to participants, and growing. He says, "The future of the program depends on the future supply of individuals qualified for it and interested in pursuing a scientific career rather than a career in administration. It will expand as the company expands, provided qualified men elect this manner of promotion."

What is a qualified man? David Beaver and John Van Wazer are typical. Beaver is Monsanto's first senior scientist, was formerly director of research. He works for the Organic Chemicals Division (St. Louis), has been active in development of new chemicals for the preservation and vulcanization of rubber, for agricultural herbicides and for soap bacteriostats.

Beaver has had 13 papers published, has been issued 50 U.S. patents, likes the opportunity to work on problems of his own choosing, subject only to the limitation that the work be related to Monsanto's broad interests. In this connection, Hochwalt notes that assignments chosen by the key researchers are determined by individual qualifications and interests, a procedure that hasn't changed in the program's 10 years of existence.

Van Wazer, besides being a senior scientist, is assistant director in charge of inorganic research in the inorganic chemicals division. He specializes in phosphorus chemistry and rheology, has published 44 papers, written nine articles for encyclopedias, authored a work "Phosphorus and Its Compounds," the second volume of which is in press.

A Harvard Ph.D. ('42), youthful Van Wazer joined Monsanto in '50 after jobs at Eastman Kodak, Oak Ridge, Rumford Chemical Works and Great Lakes Carbon.

What's It Worth? This kind of talent comes high, but is worth the price, Hochwalt believes. One man was responsible for $4 million in gross profits last year, another achieved monumental—although not precisely measurable—savings in phosphorus production. Hochwalt says, "Under the program it is possible for a senior scientist to make as much money as the president of the company."

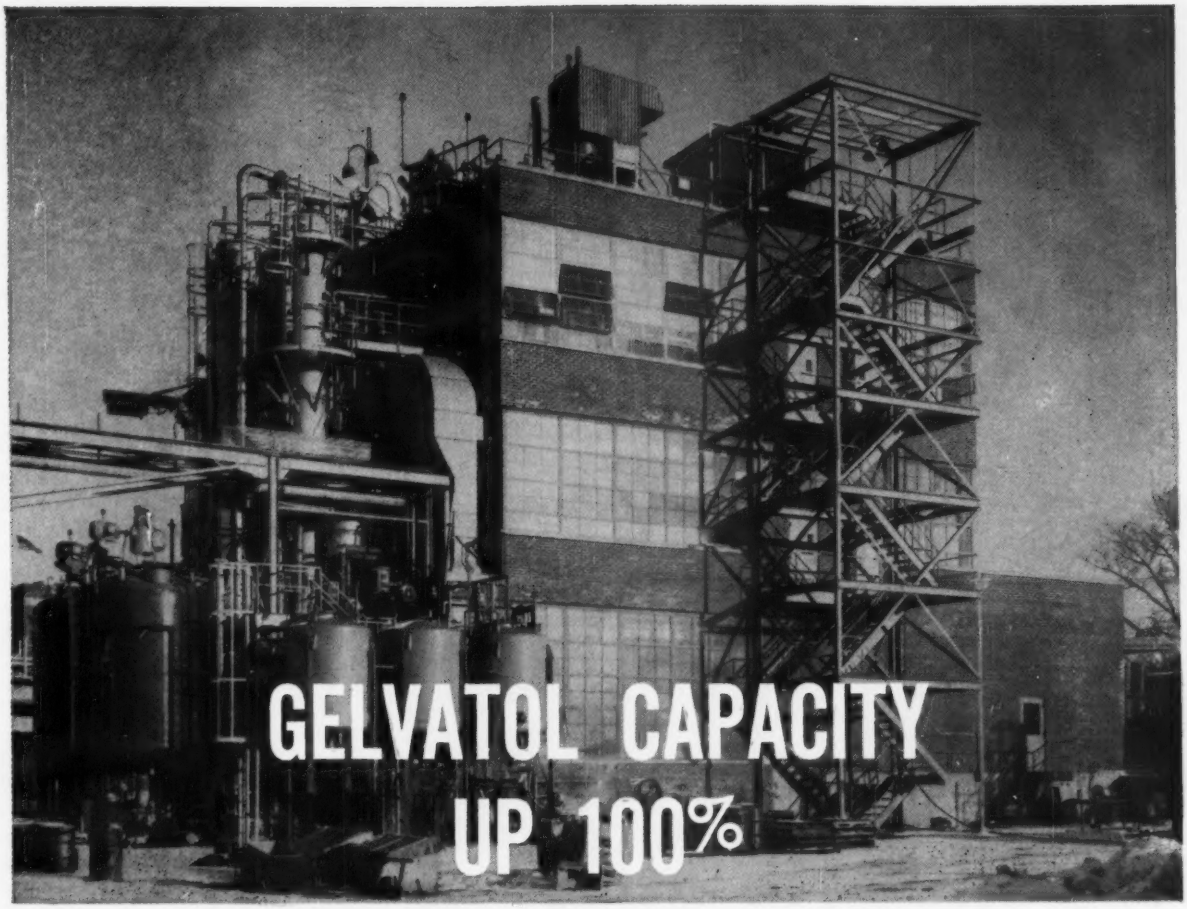
He figures it's good policy to be liberal in other ways, too. While scientists' expense accounts are monitored, as are all expense accounts in the company, they are liberal enough to provide freedom to attend a number of scientific meetings.

Nor has the program suffered from economic setbacks — for example, during the '58 recession, there was no cutback of scientists, senior scientists, technologists or senior technologists.

On Feb. 25, members will hold their first annual science seminar, at which 15 papers will be presented. Following this, the group will hold a black-tie dinner, second of what is shaping up as an annual affair. Hochwalt and Monsanto President Charles Allen Thomas will attend.

This kind of program is probably too expensive for most small companies. But Hochwalt points out that "in a small company, the executive and scientific levels are often one and the same. As companies grow larger, there tends to be a difference in favor of the executive and administrative levels.

"This program is one way of making it possible for a qualified individual to satisfy his desire for continued scientific achievement as the company with which he is affiliated expands.



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1-60	28-32	0-2	100-99
3-60	23-28	2-4	99-97.9
20-60	21-25	19.5-24	89-86
1-30	4-6	0-3	100-98.5
20-30	4-6	19.5-21.5	89-87.7
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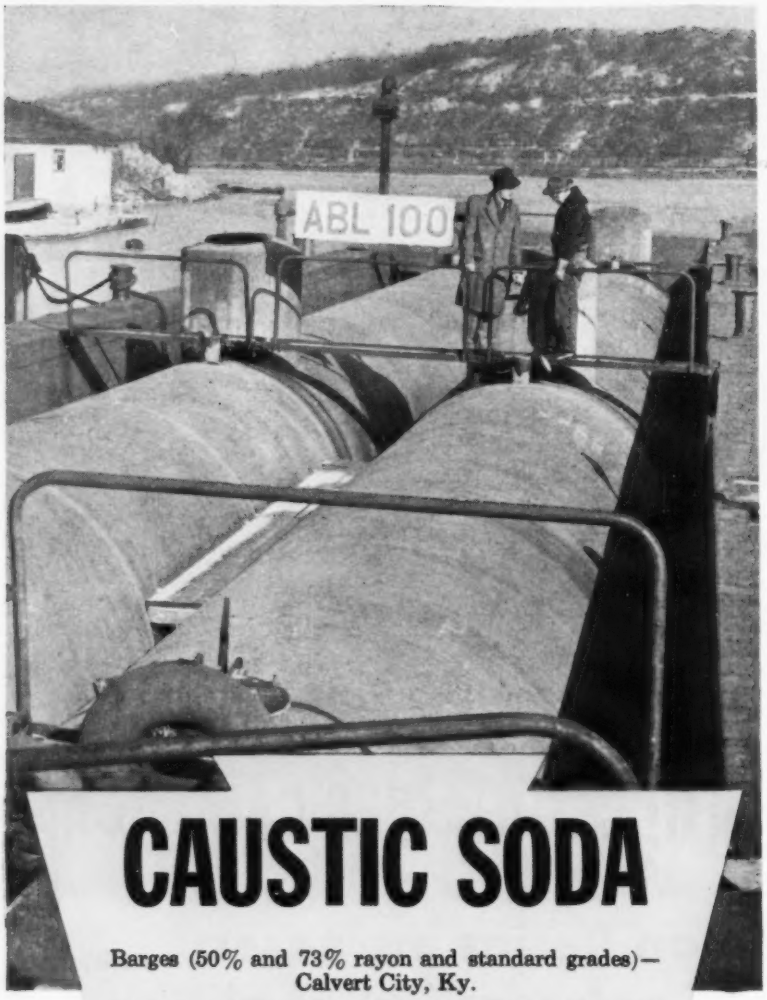

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Tank Cars (50%, 73% rayon grade)—Calvert City, Ky.

Tank Cars (50% and 73% standard grade)—Calvert City, Ky. and Wyandotte, Mich.

Tank Cars (50% standard grade)—Lemont, Ill. and McKees Rocks, Pa.

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Drums (solid, crystal and flake)—Wyandotte, Mich.

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RESEARCH

New Epoxy Entry

The new family of epoxy resins introduced by Food Machinery and Chemical Corp. last week (CW Technology Newsletter, Feb. 6) offers novel chemical structure that pays off in a variety of ways, including easy and inexpensive curing, low density, good high-temperature properties.

Essentially epoxidized polyolefins, the new resins have three types of cross-linking sites — epoxy, hydroxyl and vinyl groups—whose relative occurrence in the molecule can be controlled. As a result, the curing step can be made more easily and at less cost than with conventional epichlorohydrin-bisphenol resins, FMC says:

- At low temperatures, the new resins can be cured with anhydrides and dibasic acids; room-temperature curing systems are under development.
- At slightly elevated temperatures (100-150 C), polyamines are used. These agents give a stable mixture at room temperature (long pot-life, important in lamination) and a fast cure when heated.

The presence of vinyl groups makes possible curing with peroxide catalysts (e.g., dicumyl peroxide), resulting in a highly cross-linked product that has low mechanical distortion at elevated temperatures, high flexural strength.

Initial price of pilot quantities (up to drum lots) of three resins (called Oxiron 2000, 2001 and 2002) now being produced at Baltimore is $1.75-2.25/lb., but commercial production would make them competitive with conventional epoxies. More volume per pound, plus cheaper curing—made possible by high proportions of relatively inexpensive agents (e.g., anhydrides, acids, glycols)—are expected to drop the formulation cost to users below that of conventional epoxies.

New Venture: Advent of the new resins marks FMC's official entry into the epoxy resin field, although notice was given last September, when the company set up an epoxy department in its Chemicals and Plastics Division. Research on the new products was initiated in the Becco Chemical Division, as an outgrowth of its work on hydrogen peroxide and peracetic acid. The project was transferred to the Chemicals and Plastics Division in '58.

Detailed compositions of the new resins are not available, although the

company says epoxidation of the polyolefin is carried out by hydrogen peroxide in an acetic acid medium, with an ion-exchange resin used as catalyst. Many different polyolefins can be used; the first three resins have aliphatic backbones based on polybutadiene. FMC's position in the field is strengthened by a number of issued composition-of-matter patents (e.g., U.S. 2,826,556; 2,829,131; 2,829,135), plus several others pending.

The company expects to see the market for epoxies expand from the current 35 million lbs./year to 100 million by '65. A large part of this expansion is expected to be in non-coating applications—first target of the new resins.

APPARATUS

Fluorine Checker: A new fluorine analyzer based on nuclear magnetic resonance is offered by Ridgefield Instrumentation Division, Schlumberger Well Surveying Corp. (Ridgefield, Conn.). The new Model 105 Analyzer can detect 3 mg. of fluorine in samples ranging from 0.2 to 40 cc.

•

Desktop Lab: A multiple strip desktop chromatography laboratory capable of running up to six different solvent systems simultaneously is now available from Microchemical Specialties Co. (Berkeley, Calif.). Price: $125.

REPORTS

These reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

• "Effects of Several Impregnants on the Oxidation Resistance of Graphite" (PB 151575, 75¢) reports silicon carbide is the most effective impregnant in lowering graphite oxidation, recommends further study of this material and of silica to improve graphite for use in rocket nozzles, guidance vanes, furnace linings, electrodes and nuclear reactors.

• "Chemistry of the Lighter Elements: Second Annual Progress Report" (PB 151534, $2.50) summarizes a year of Navy research on this subject, with emphasis on the formation of a new class of compounds by reacting diborane or boron halides with cyanosilanes.

FOR INFORMATION...

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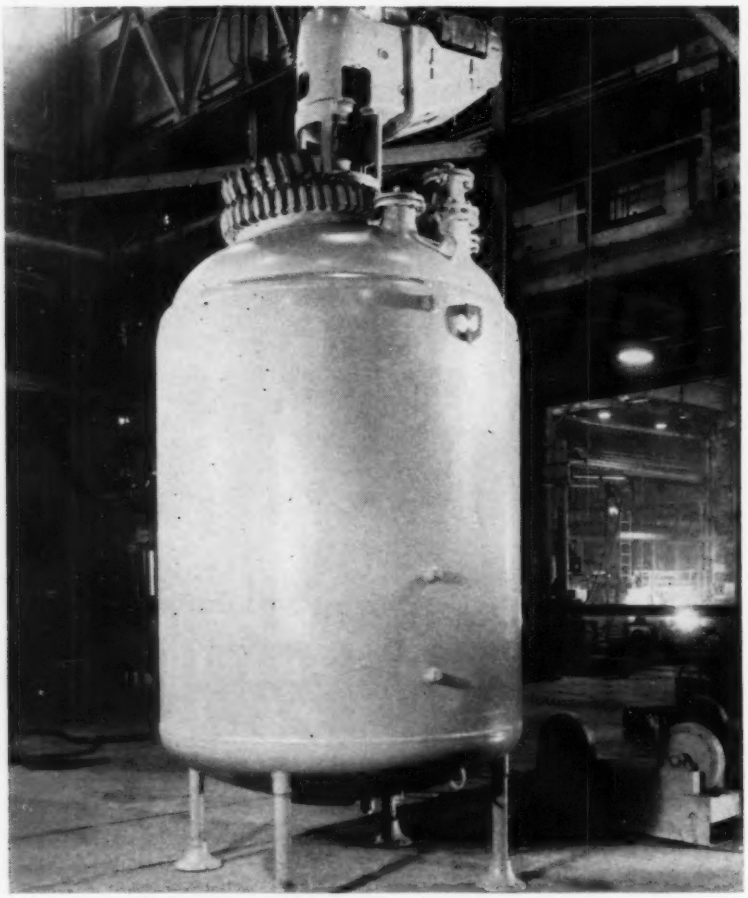
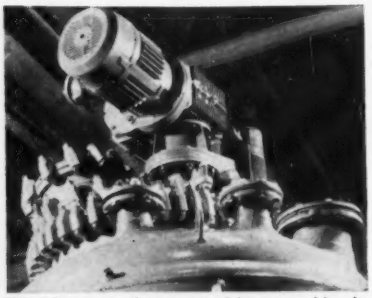
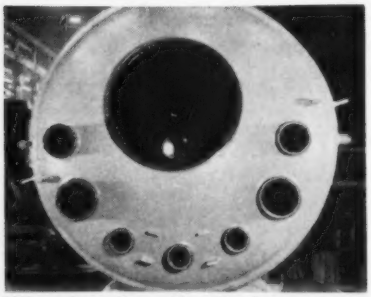
FLUIDICS* AT WORK



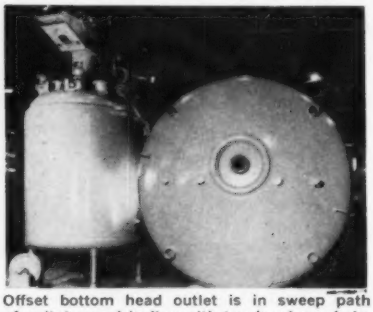
Different silhouette and light-blue exterior tell you the Pfaudler "RA" Series Glasteel Reactor is new. Unit shown has BH drive.



TW drive, one of two new drives, provides increased stability for agitator shaft. Runs very quietly.



"Mirror image" provides like-size nozzles on each half of top head. Facilitates piping.



Offset bottom head outlet is in sweep path of agitator and in line with top head manhole.

NEW from top to bottom . . . Pfaudler "RA" Series Reactors

The old "Pfaudlers" (R Series) that you're so familiar with are passing from the scene.

In their place, we now offer you the all new "RA" Series Glasteel Reactors with many significant design improvements.

Two New Drives. Starting at the top you'll find the TW drive on the 300 through 1000 gallon reactors for power requirements to 15 H.P. The BH drive takes over on the 1500 gallon and larger sizes for power requirements to 60 H.P.

Both drive designs are compact, easily installed and maintained. Very quiet, too—a difference that's appreciated when operating a full line of reactors.

Mirror Image Top Head. Next, note the equal number of nozzles on each half of the top head, placed symmetrically for ample freedom in piping. For example, you can feed two reactors from a single tee—one to the left, one to the right.

And since there are no cumbersome drive supports, you have convenient access to manhole, observation window, nozzles, drives, baffles, dip pipe and mechanical seal.

Offset Drain. Off the bottom head you get fast drainage, since the outlet has been offset from center to a position in the direct sweep-path of the agitator. Also, the outlet is in line with the top head manhole for convenient inspection.

Corrosion Resistance. Of course, inside there's Glasteel 59. Excellent resistance to all acids (except HF) to 350° F. and on to 450° F., depending on concentration. Mild alkalies at moderate temperatures are also permissible. Thermal shock resistance is 30% over the "R" series. At a vessel temperature of 250° F. your recommended safe temperature differential is now 260° F. Abrasion resistance has also been increased by 20%. Glasteel 59 is smooth—resists build-up of sticky products. As a result, you have high heat-transfer rates, increased product yield, fewer shutdowns for cleaning, and much longer service life.

Stock Delivery. Standard "RA" Series Reactors range in size from 300 to 4000 gallons. The 500, 750, 1000 and 2000 gallon vessels, fully assembled with standard drives and agitation, are pre-stocked for *two-week* delivery from receipt of your order.

Write for Specifications. New Bulletin No. 988 is now available. For your copy, write to our Pfaudler Division, Dept. CW-20, Rochester 3, New York.

Does a WIPED FILM evaporator fit your process?

Yes, if you evaporate products that are

(1) heat sensitive, or
(2) highly viscous, or
(3) low in thermal conductivity.

What makes the Pfaudler Wiped Film Evaporator so well suited is the *mechanically wiped* evaporating surface.

It works like this: Centrifugal force of an internal rotor (pictured at the right) holds four free-floating wipers in contact with the evaporator wall. These wipers spread your product out over the entire evaporating surface in a *thin, uniform* film. Slots in each wiper prevent product "curl" forward of the wipers and accelerate product movement down the wall.

Since the heated wall is kept completely wet, you are sure of maximum heat transfer —a very important consideration with viscous and heat-sensitive materials, or those with low thermal conductivity.

Test, anyone? In our Test Center we maintain a 4-square-foot Wiped Film Evaporator for product evaluation studies.

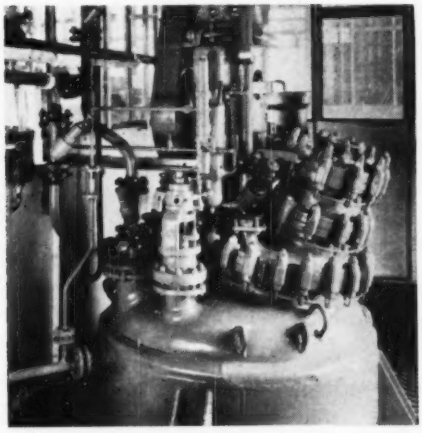
Production units offer 4 to 100 square feet of evaporating areas. (That's a 50-square-foot one being assembled in the picture.)

We'd be happy to send you detailed specifications or provide further information about the test program.

"By Pfaudler glassed-steel equipment a whole pack of problems got its best solutions."

Literally translated into English from German, this statement sums up nicely the experience of C. F. Boehringer & Soehne GmbH.

Established in 1859 and located in Mannheim-Waldof, Germany, this famed pharmaceutical firm has made many important contributions, particularly in the field of antibiotics.



Naturally, much attention is paid to cleanliness and product purity. So you find whole batteries of Pfaudler reactors at work. No problems with corrosion from processing under acid conditions from pH 7 to pH 4; no problems with operating temperatures from 85 to 120° F; no problems with quick and complete cleaning—since these conditions fall comfortably within the much broader range of corrosives and operating temperatures recommended for Glasteel.

Not only are these reactors *in* use in Germany, they were fabricated *there* by our German subsidiary, Pfaudler-Werke, A. G.

Which leads us to the fact that you can take advantage of our FLUIDICS program almost anywhere in the world. We maintain, along with our German facility, plants in Great Britain (Enamelled Metal Products Corp. Ltd.), Canada (Ideal Welding Co. Ltd.), Mexico (Arteacero-Pfaudler, S. A.), and Japan (Shinko-Pfaudler Co., Ltd.). Of course, many of our products and services flow from our four plants in the U. S. A. So, wherever you are, we'll come to you.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

You can specify Glasteel for these and many other chemicals

Acetic acid	DDT
Aluminum chloride	Ether
Aluminum sulfate	Ethylene glycol
Ammonium thiocyanate	Formaldehyde
Ascorbic acid	Hydrochloric acid
Benzene	Nitric acid
Benzyl chloride	Phenol
Butyl alcohol	Phosphoric acid
Bromine	Phosphorous oxychloride
Caustic soda	Potassium sulfate
Chlorine dioxide	Sodium chlorate
Monochlor-acetic acid	Sulfuric acid
Chloroform	Thionyl chloride

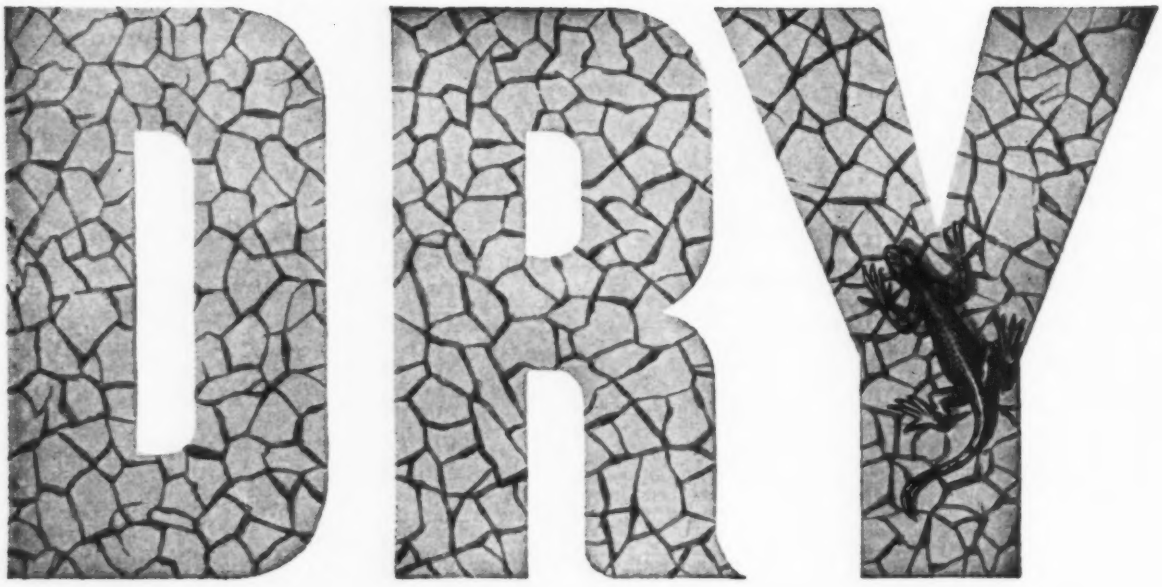
In fact—with any acid (except hydrofluoric) GLASTEEL just keeps working and working, at temperatures up to 350° F., even up to 450° F., depending on concentration. And alkalies at moderate temperatures have no effect on GLASTEEL.

The Pfaudler line of Glasteel process equipment includes reactors, storage tanks, columns, dryer-blenders, pipe, valves and fittings. Specifications are given in our Buyer's Guide, Bulletin No. 980.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

If it must stay



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DEPARTMENT 35202

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
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Washington
Newsletter

CHEMICAL WEEK
February 13, 1960

Drug companies in trouble with FDA for allegedly issuing drugs that don't stick to specifications or neglecting products that don't meet specifications will be named in the next session of drug price hearings that start Feb. 23. FDA Commissioner George Larrick said he would name them "if asked"—which he will be. His testimony will give support to some claims of big firms that their quality-control checks are superior to those of some small-fry operations.

•

A free hand for universities in medical research would be offered in a bill submitted to Congress last week by Secretary Flemming. It would earmark 15% of the research grants made by the National Institutes of Health for universities to use as they see fit, with no accounting and no project clearance required. Purpose is to allow for research ventures that a Congressional committee might consider too big a gamble for investment of taxpayers' money.

•

Polyethylene film makers may have licked a toxicity problem: chemical agents migrating from the film into fatty meats. This had worried producers and packagers who feared polyethylene wrap would be banned March 6, the deadline for proving the safety of food additives.

Technicians of industry and FDA, working together, have found ways of making the plastic wrap they believe will overcome FDA objections. Details have not been revealed.

Publication of a list of 84 common chemicals used in packaging materials that are exempt from the safety testing requirement (because they are generally recognized as safe) takes a good share of the industry off the hook. FDA will apparently be fairly liberal in granting extensions of time on other packaging materials, will not move against any company that has submitted a petition for clearance, even if there is no time to study the petition before the deadline.

Makers and users of color additives in food, drugs and cosmetics got a reprieve last week, too. FDA agreed to hold hearings on their ban on lipstick colors, thereby delaying action. Three of the 17 colors in question were also found to be harmless. Meanwhile, the color bill that's expected to pass Congress will take care of the problem.

•

U.S. East-West trade controls are likely to stay tight for some time to come. Latest indication of this came last week, when the Commerce Dept. went only part way in easing export licensing red tape on some industrial chemicals, machinery and equipment that the U.S.'s Allies freed for shipment to the Soviet bloc.

Commerce agreed to remove these items from a list that requires exporters' proof they will not be transshipped to Iron Curtain countries.

Washington Newsletter

(Continued)

They are not removed from the U.S. "positive list" of goods that usually are denied license to be sold to Soviet bloc nations.

At the same time, Commerce added to its positive list a number of electronic equipment items for the first time.

Net effect of the two moves was to continue tough U.S. controls while our Allies ease their export curbs on sales to Communist countries. The last time the U.S.'s Allies substantially eased restrictions on exports to Russia and its satellites, in '58, the U.S. followed suit.

While not connected with the breakup of negotiations with Russia over its lend-lease debt settlement the week before—which was to be a prelude to consideration of easing curbs on U.S.-Russian trade—the Commerce Dept.'s actions last week showed that Washington is in no mood to take the lead in expanding trade with the Soviets.

•

Agricultural chemical makers will get no time extension for compliance with food additives regulations even though they have set up a commission of scientists to study the problem. Secretary Flemming made that clear this week. At the same time, he won't oppose establishment of any group to study the problem.

But Republican pressure on Flemming to be "reasonable" is mounting. Note an attack in the House Feb. 2 by Rep. Henry Dixon, highly respected former college president from Secretary Benson's state of Utah. Dixon pointed out that, if Flemming pursued his course *ad extremis*, he would have to ban sugar, peanut oil, lard and other agents that might cause cancer in repeated, concentrated injections.

•

Two plants to desalt brackish water will be located at Webster, S.D., and Roswell, N.M. The one at Webster will be a 250,000-gal./day electrodialysis plant; Roswell will get a forced-circulation vapor compression distillation plant of the same size. Both cities are helping defray the federal investment by donating plant sites, purchasing the fresh water, etc. A fifth and final process will be selected within three weeks, for a seawater conversion plant on the East Coast.

•

A veto on doubling funds for sewage treatment works is considered a certainty. But the President may try to soften his first veto of the session by suggesting certain steps to tighten up existing enforcement procedures against plants or cities that are polluting streams.

Laws could be tightened up, for instance, by giving the federal government control over pollution of any "navigable" stream instead of just "interstate" pollution, which is sometimes difficult to prove. Senate and House conferees quickly compromised last week on a bill to increase grants from $50 million to $90 million/year, although Eisenhower wanted to cut it to $20 million this year. Democrats view a veto as a good campaign issue in many districts.

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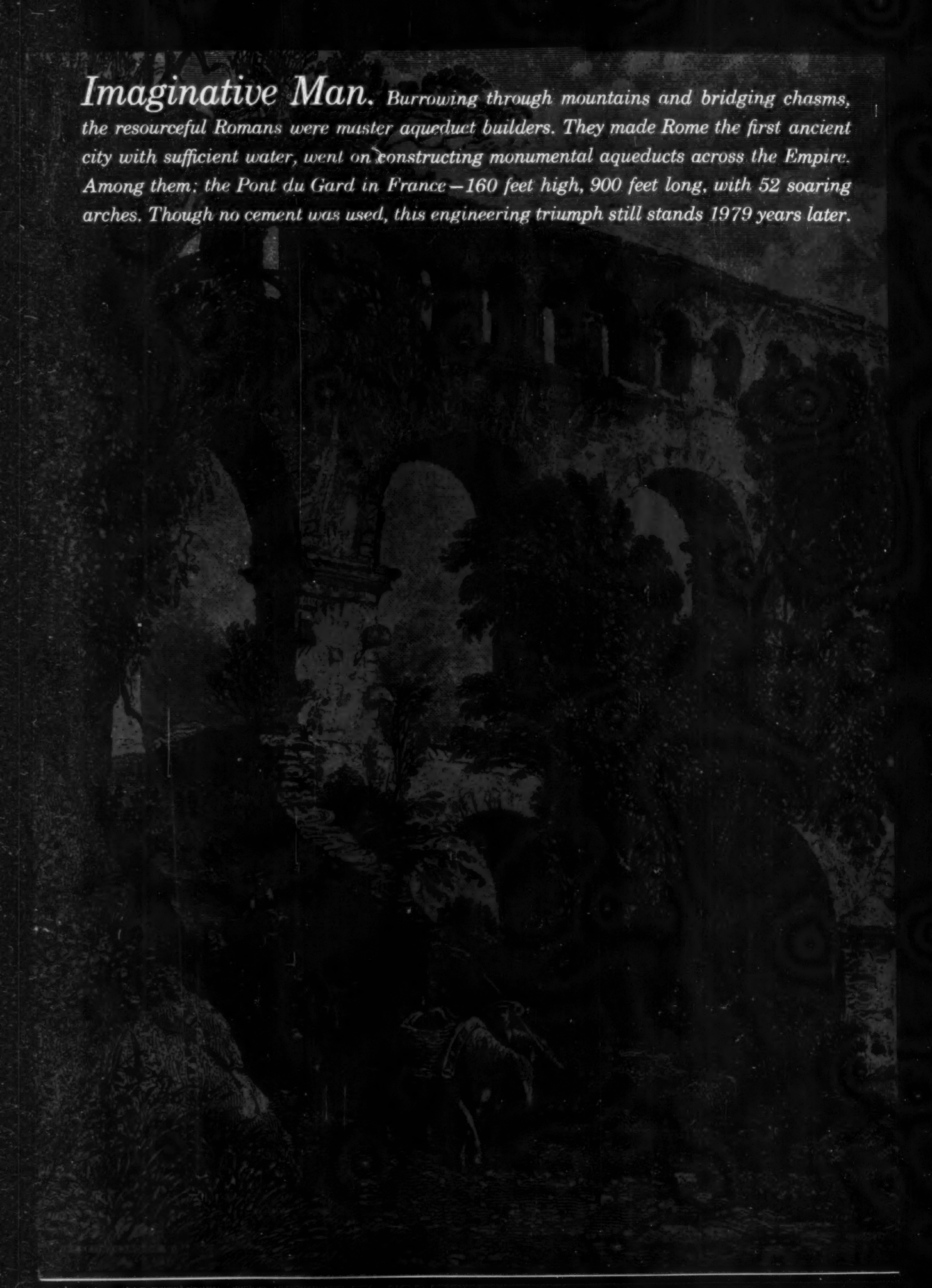

Imaginative Man. *Burrowing through mountains and bridging chasms, the resourceful Romans were master aqueduct builders. They made Rome the first ancient city with sufficient water, went on constructing monumental aqueducts across the Empire. Among them: the Pont du Gard in France—160 feet high, 900 feet long, with 52 soaring arches. Though no cement was used, this engineering triumph still stands 1979 years later.*

A major contribution of modern Imaginative Man is the unceasing flow of ideas and new developments that sustain the dynamic growth of the chemical manufacturing industry. In this swift-paced field, laboratory discoveries and technological advances must be translated into new mass-produced products in the shortest possible time. This requires a high degree of creative collaboration between chemical companies and the firms that design and build their plants.

Fluor's 25 years of experience in design, engineering and construction for the chemical process and refining industries includes all types of unit processes and operations.

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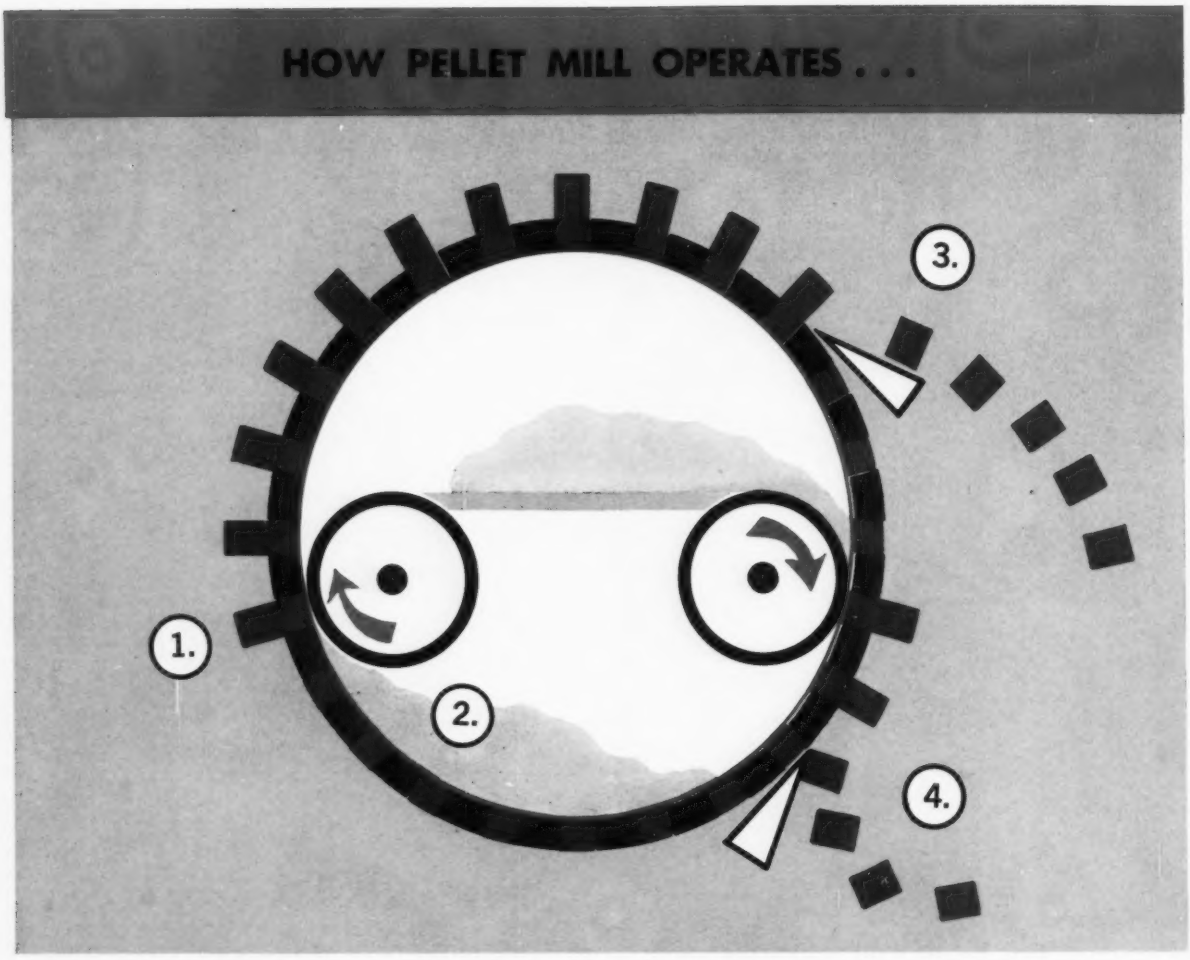


Pellet Mills Press for More Chemical Process

Pelletizing, the simple processing step shown above, is gaining new favor in the CPI to "standardize" working material, cut dust, improve product handling. At Metropolis, Ill., for example, two pellet mills are the key to agglomerating fine uranium concentrate in Allied Chemical's General Chemical Division uranium hexafluoride plant undergoing process shakedown this week.

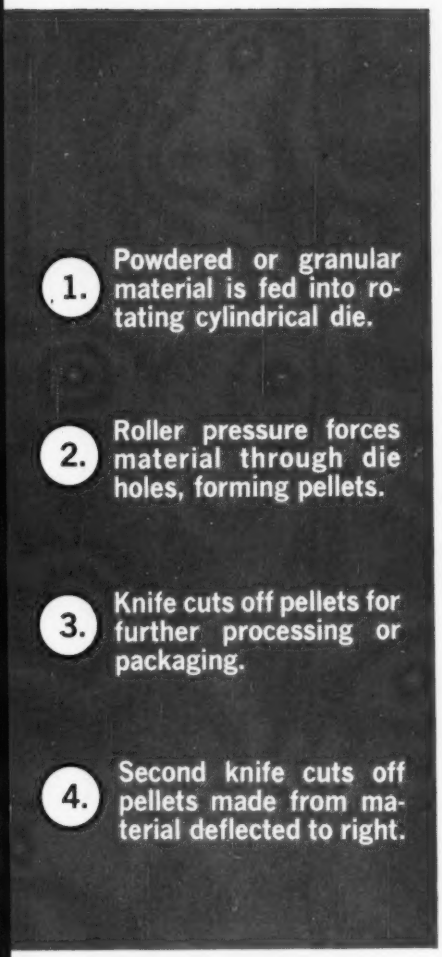
Money-saving applications of this type of equipment, bringing improved processing and materials-handling of various chemical products, are helping pellet mills finally gain a foothold in the chemical industry. Long available to chemical processors, and used by the thousands in feed processing, the mills have only recently been used in numbers for materials such as clay, graphite, sodium nitrite, alumina, polyethylene and polyvinyl chloride. An estimated 200 units are used by the CPI now.

And only two pellet mill makers, Sprout, Waldron & Co. (Muncy, Pa.) and California Pellet Mill Co. (San Francisco) have actively courted the chemical industry. Both got their start more than 25 years ago, selling to the feed industry.

In the process industry, SW, which supplied the mills at Metropolis, appears to have the edge in units sold. Its first mills, for pelleting clay catalyst carriers for aviation gasoline, were sold in '45. But big gains were not registered until '55, have since been sparked mostly by plastics makers.

CPM sold a few mills for iron oxide pelleting in the '30s, others for graphite to the electrochemical industry later. But it didn't begin to push for process industry business until three years ago, when it formed a Process Pelleting Division based at its Crawfordsville, Ind., plant, and exhibited at the '57 Chemshow for the first time.

Only 40%: The transition from processing easily pelleted feeds to handling the variety of chemicals now pelleted hasn't been simple. "We still can successfully pellet—meet specific process requirements—only about


1. Powdered or granular material is fed into rotating cylindrical die.
2. Roller pressure forces material through die holes, forming pellets.
3. Knife cuts off pellets for further processing or packaging.
4. Second knife cuts off pellets made from material deflected to right.

Work

40% of the materials we're asked to test," says SW staff engineer Bob Stroup.

But when pelleting can be applied, it has a number of distinct advantages. When applied to powdered materials, it eliminates dust in handling, helps cut the cost of dust collection systems. (Pellet mills are sometimes used as part of the dust collection system to reclaim fines.) The pellets are compact, tough. They can be bulk-handled without disintegration, stored and packaged in less space than can many light powders. Hygroscopic materials—if they can be pelleted—remain free-flowing, don't cake.

Powdered materials susceptible to aeration and flooding can be pelleted to improve subsequent handling. For example, Robert MacDaniel, CPM's Process Pelleting Division manager, points out that polyethylene polymers with densities of 6-15 lb./cu.ft. can be compacted to as much as twice their original densities.

Sprout, Waldron has sold mills as part of its system for reclaiming polyethylene scrap, says the pelleted product can cut the compounder's cost 20% over product reclaimed by fusion methods.

Filter cakes with as much as 70% moisture can sometimes be pelleted, dried economically (e.g., nylon filter cake). And some powders can be cooled and dried with less expensive equipment because the pellets take up less space, aren't easily entrained by drying air.

Process Problems: While SW and CPM have learned to process materials with many different characteristics, pellet-mill processing likely is limited by the existing mill design. And pellet mills used by the chemical industry are of one basic design.*

In SW and CPM mills (*see diagram*), material is fed into a rotating, cylindrical die. The motion of the die (and in some cases, baffles) feeds the material to pressure rollers, which force the material through holes in the die. The extruded material extending beyond the face of the die is cut off into pellets.

The only agglomerating and compacting in these mills is that which is caused by the pressure rollers forcing the material through the holes. Some materials won't agglomerate, require the addition of binders such as starch. Other materials require the addition of lubricants to prevent their sticking in the die. Stearates, water and alconol are used as lubricants; alcohol evaporates to leave the product free from contamination. Some materials, however, can't tolerate the contamination of binders and lubricant because of end-use requirements.

Friction caused by forcing material through the die usually keeps operating temperatures above 140 F. Some materials (e.g., phenolic resins) are temperature sensitive, may be advance-cured during pelleting. And some materials may be formed into pellets with fused skins and powdery interiors.

Potential contamination from bearing lubricants in the pressure rollers has in many cases ruled out pelleting of pharmaceutical products or products that might cause lubricants to burn. Both SW and CPM have designed special seals to minimize contamination; in fact, seal design helped CPM get one pelleting job on chromate.

Individual characteristics of a feed material determine whether it can be pelleted—each product must be tested out. For this reason, MacDaniel says CPM generally does not list pelletable materials. Nor is CPM concerned when companies submitting test samples don't identify their products. For example, a product from one manufacturer may contain moisture, be easily pelleted, while the same product from another manufacturer, but without moisture, may not be pelletable. Only testing gives the answers.

SW talks freely about materials it can pellet, but also stresses the importance of the product's characteristics. For example, Stroup explains that SW mills made under license in Europe are used for urea pelleting without problems. In this country, prilling has been more trouble-free than pelleting.

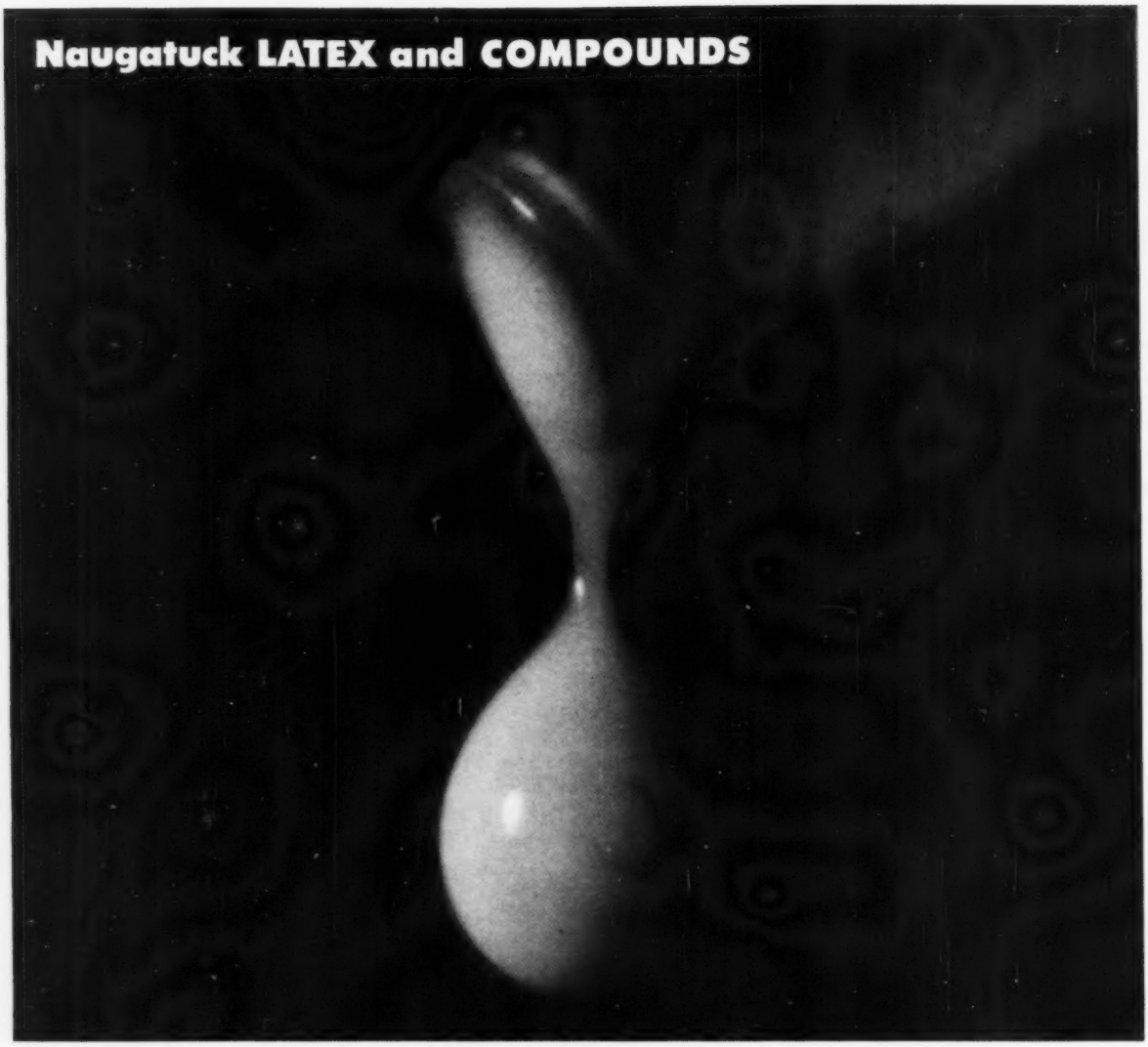
Machine Variables: In addition to preconditioning the feed material, pelletability and mill capacity can be varied by changing feed rates, die speeds (usually 75-500 rpm.), number and diameter of die holes. Die thickness can be varied, and the shape of the die holes can be changed (e.g., round, square, tapered).

Distance of knife blade from the die can be changed to obtain a longer or shorter pellet. A pellet's length is usually at least twice its diameter, but actual shape is irregular, can't be controlled as in pill-making, in which closed dies are used.

Die life is determined by abrasiveness of the feed material and the die alloy, varies between 50-4,000 tons. Minimum die cost would be about 10¢/ton, according to Stroup,

* Pellets are formed by various techniques (e.g., plastics are extruded, cut into pellets by dicers; some materials are compacted by rolls and broken up, others are agglomerated in rotating drums), and some compacted materials are, rightly or wrongly, called pellets.

Naugatuck LATEX and COMPOUNDS



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A new world of almost magical product possibilities was opened the day Naugatuck first made the use of natural latex practical. And today, with the sweeping variety of natural, synthetic, and plastic latices and compounds available from Naugatuck, the possibilities for product improvement are greater than ever before.

New scrubbable paints, waterproof papers, non-woven fabrics, more practical carpets, pressure-sensitive adhesives are but a few of the literally thousands of products improved or even made possible through the "magic" of latex and latex compounds.

Still more powerful magic is brewing in the laboratories of Naugatuck now as its pace-setting latex and compounding specialists continue the developmental work that has brought Naugatuck to its position of leadership in the field.

Discover the product-improving abilities of a Naugatuck latex or compound for yourself. For basic latices, for ready-to-use compounds from the world's leader in latex compounds, contact your Naugatuck Representative or the address below.

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while basic mill cost would range from $4,000 to $10,000, not including the motor.

Variables that will require close study in the future, if pellet mills are to gain wide acceptance, are temperature and pressure. Now it is difficult to measure or control them. But work that has already been done in pelleting indicates that pellet mills are clearly on the way toward chemical industry acceptance.

EQUIPMENT

Filter Fabric: A new line of monofilament and multifilament propylene filter fabrics is now available from Technical Fabricators Inc. (136 Washington Ave., Nutley, N. J.). TFI says the propylene fiber, because of its inherent slickness, has a "built-in cleanliness," and no cake release problems. Its slickness also minimizes blinding, cuts cleaning time and permits multiproduct use without changing cloth. Fabrics can be used at temperatures up to 275 F for most acids, alkalis and solvents.

•

Sampling Valve: Strahman Valves, Inc. (Florham Park, N. J.) is out with a sampling valve that guarantees an uncontaminated sample. Key: a piston that completely fills the interior of the valve when closed, thus prevents foreign matter from gathering. A minimum of turbulence is created in the process stream because valve parts are outside the pipe; the closed piston is flush with the pipe's inside diameter.

•

Packaged Heaters: In keeping with the trend toward use of packaged equipment, Brown Fintube Co. (300 Huron St., Elyria, O.) is now prepackaging its Type 102 fired heaters. All combustion, flame safety and automatic control equipment are mounted in position, wired and ready for operation. Users need make only one fuel and one electrical connection. The fintube heaters, used for obtaining temperatures up to 1000 F, have capacities ranging from 100,000 Btu./hour for 2½-in. tubes to 1 million Btu./hour for 10-in. tubes.

•

Pipe Insulation: Union Asbestos and Rubber Co.'s Fibrous Products Division (1111 West Perry St., Bloomington, Ill.) says its new lightweight, rigid, urethane-foam pipe insulation, called U-200, has the lowest thermal conductivity known for a commercial product of its kind. Union says the insulation has a thermal conductivity (k) factor of 0.14 at 70 F, can be used at temperatures from —300 F to 220 F, has low moisture absorption rate, isn't affected by most mastics and sealers.

•

Tubing Valve: A compact, lightweight, tubing valve for liquid and gas pressures up to 12,000 psi. is a new product of Autoclave Engineers, Inc. (2930 West 22nd St., Erie, Pa.). Sleeve-installed, the valve requires no use of threading, swaging, flaring, welding or special tools. Large port openings maintain a minimum pressure drop through the valve. Sizes are available for ⅛-, ¼- and ⅜-in. tubing.

•

Screening Metal: Cross Perforated Metals, division of National-Standard Co. (Carbondale, Pa.) is manufacturing—under a license from Hein Lehman & Co. (Germany)—a pierced-metal screen claimed to have a higher throughput efficiency and three times the life of perforated metal screens used in gravity and centrifugal separators. Called Conidure, the screen has humps on its working side that shovel material to the openings. Hole diameters are 0.004-0.099 in., sheet thicknesses from 0.014-0.079 in.

•

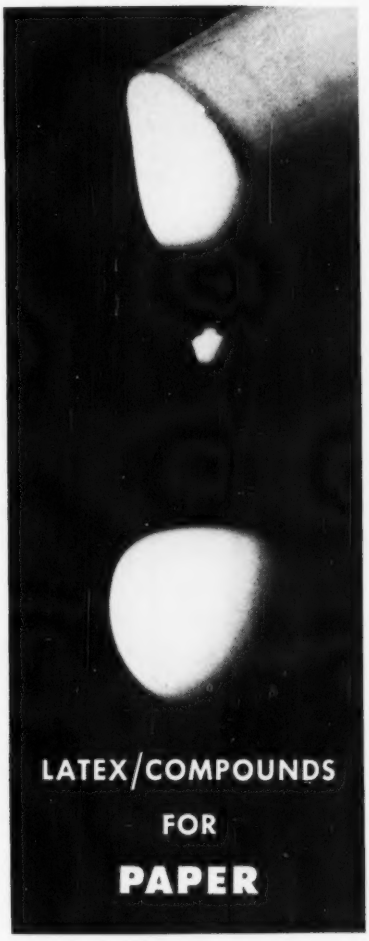
Explosionproof Vibrator: Vibro-Plus Products, Inc.'s (Stanhope, N.J.) new Model ER-32 vibrator is explosionproof, for use in moving granular and bulk products through bins, chutes and hoppers in hazardous, Class 1, Group D, locations. The vibrator is totally enclosed, nonvented, will produce impacts of 385 to 1,100 lbs.

•

Salinity Tester: An immersion-type conductivity cell with automatic temperature compensation and thermistor for temperature measurement is a new product of Industrial Instruments, Inc. (89 Commerce Road, Cedar Grove, N.J.), for testing stream salinity.

•

Silicone Rubber Tape: Permacel's (New Brunswick, N.J.) new ES 5111 silicone-rubber coated, glass-cloth tape can be used for motor rewinding without application of heat and pressure.



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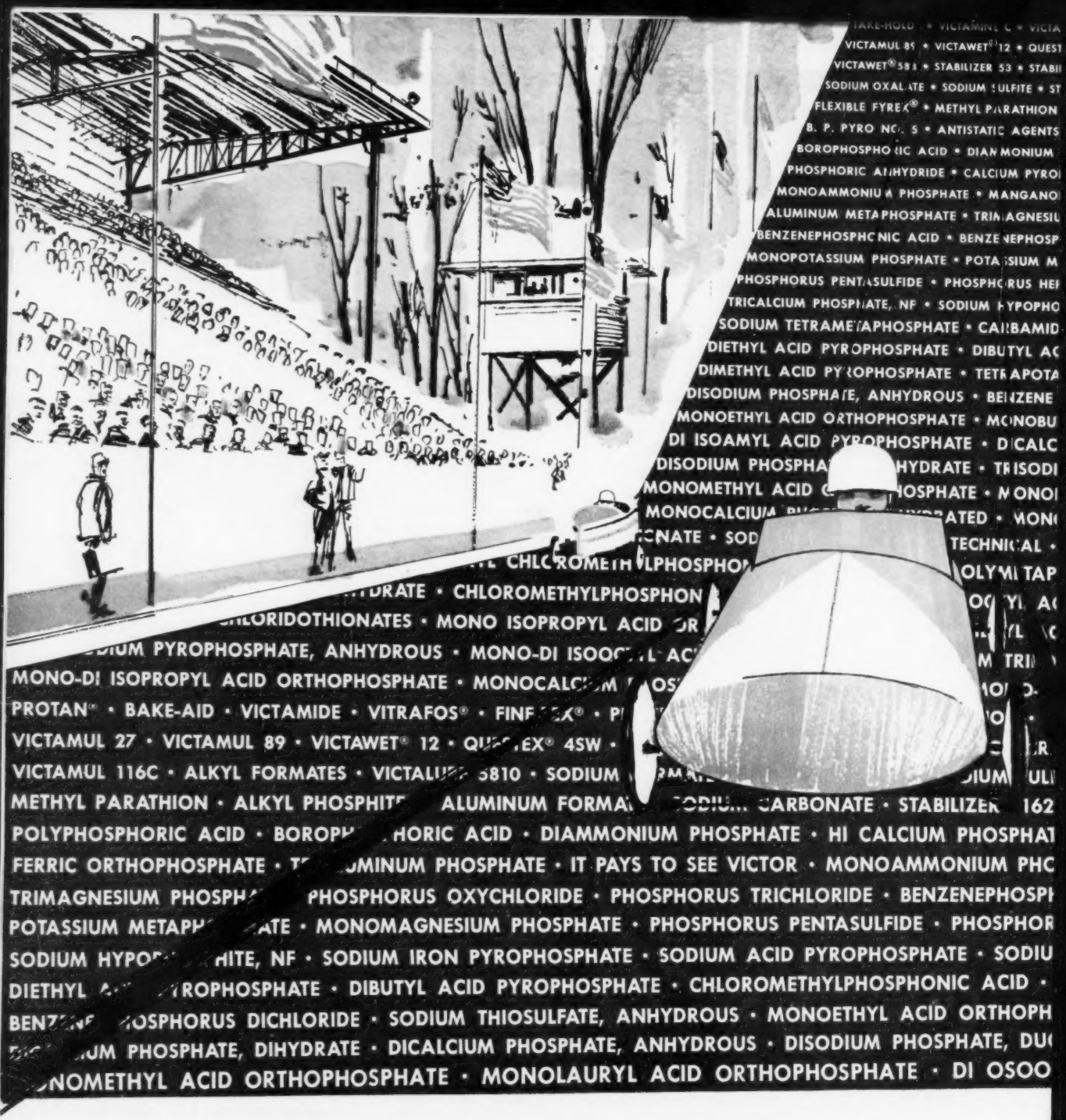

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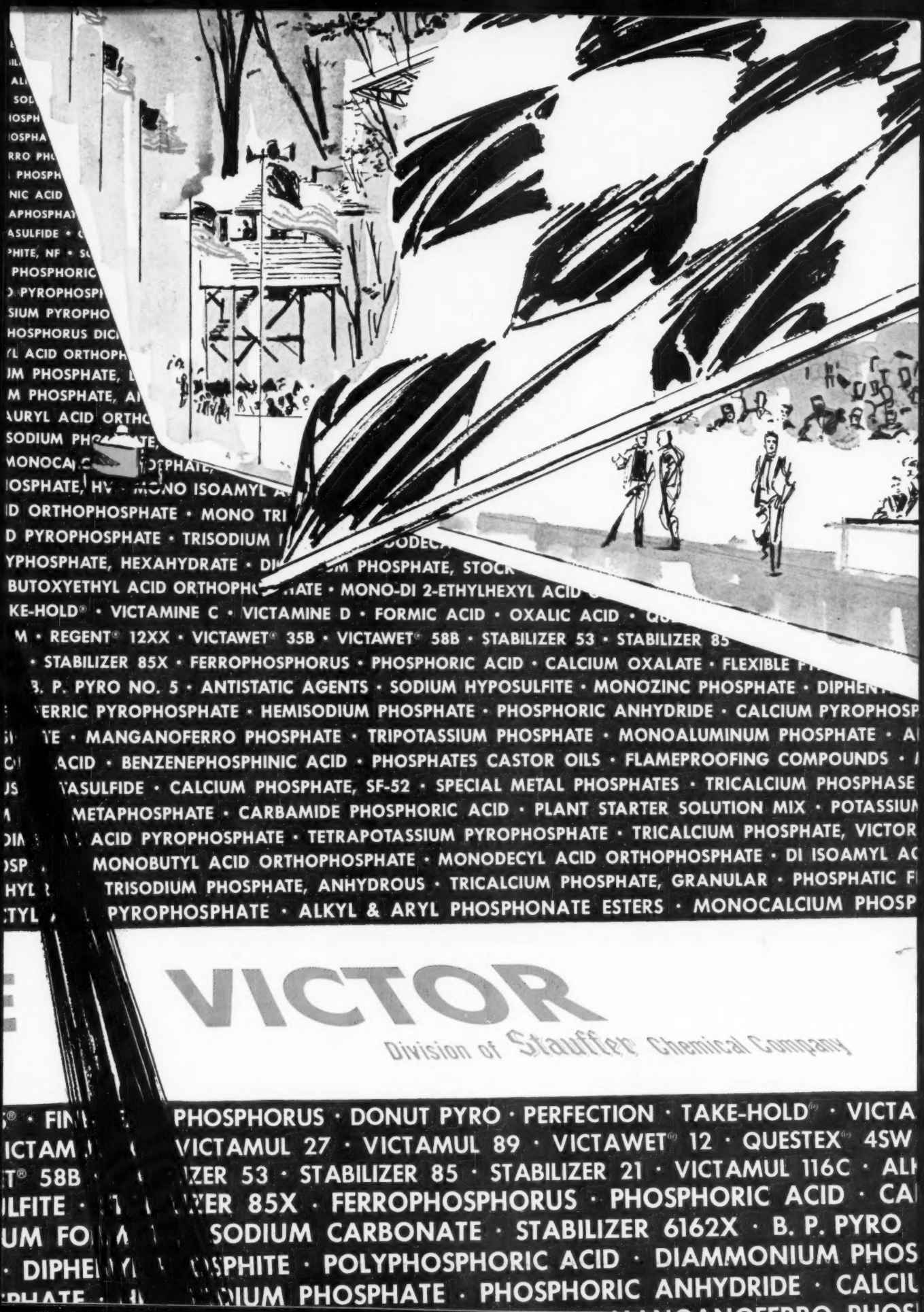
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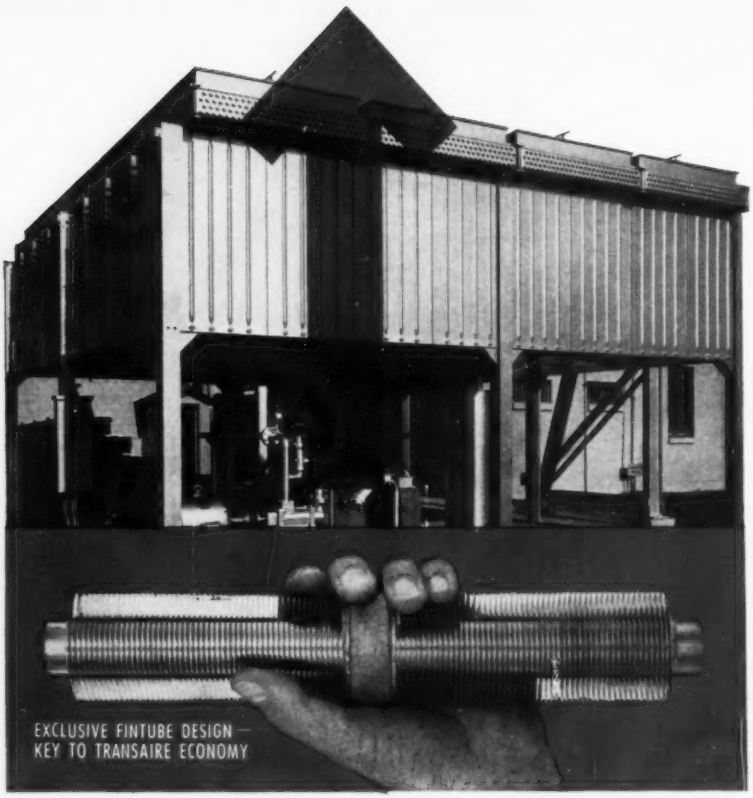

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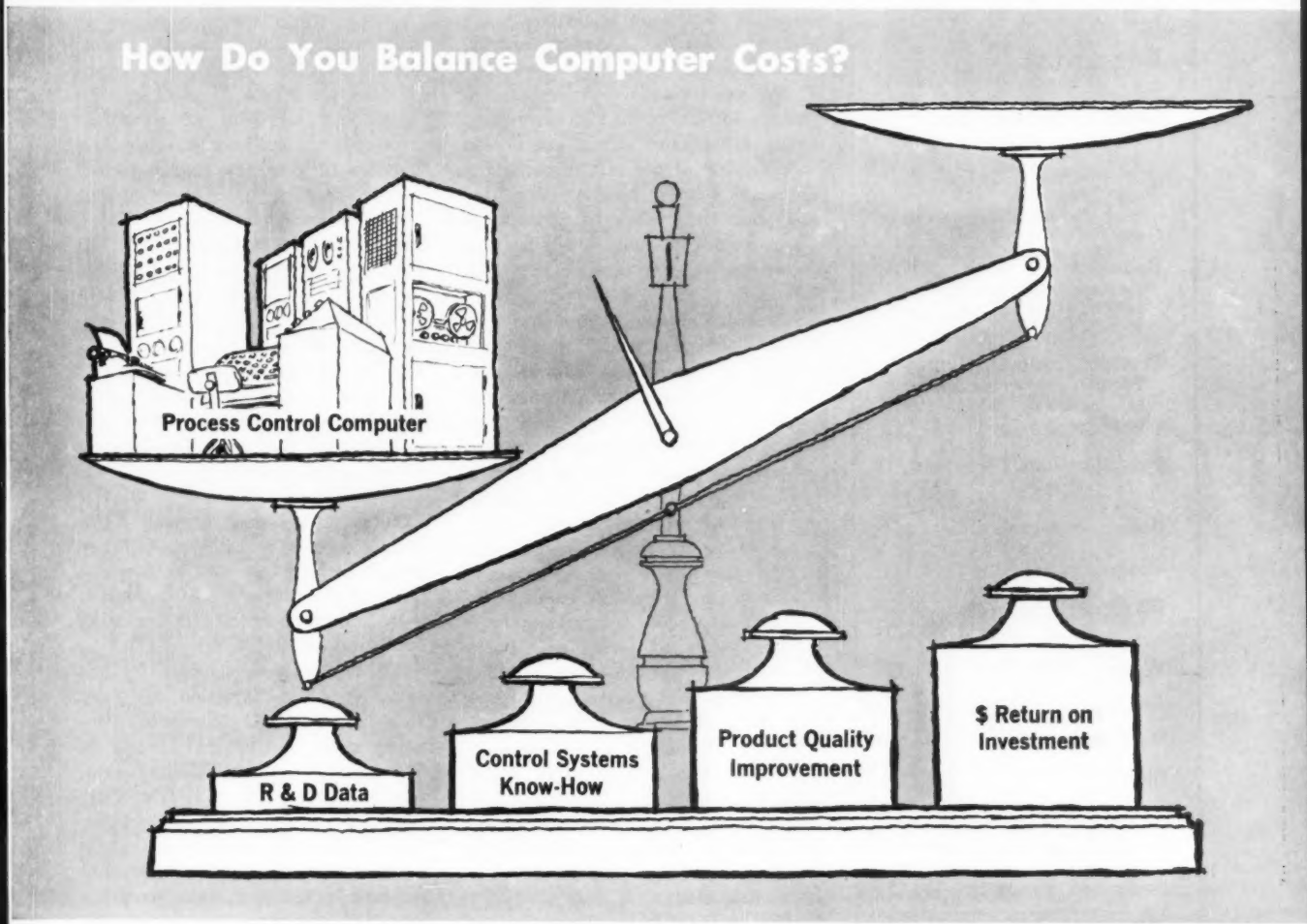

Problem: Balancing Computer Investment

The potential payoff on process-control computers was the issue at two meetings last week—one in Houston, Tex., the other in New York City. Bullish proponents of control systems spoke out in favor of balancing computer investment with such indirect benefits as research and development information and accumulation of systems know-how; bearish processors insisted on more direct dollar returns.

But both sides are agreed that management's attitude—be it bullish or bearish—will set the pace for progress in computer-controlled processing.

Both Kenneth Otto — a Dow man who held forth at the Houston winter instrument-automation conference of the Instrument Society of America—and Du Pont's C. R. Hall—speaking at the winter general meeting of the American Institute of Electrical Engineers—emphasized three key points:

(1) Process-control computers must be economically justifiable—if not immediately, at least soon.

(2) Earliest applications will most likely involve small analog or digital computers designed to maintain dynamic processes at optimum operating conditions; long-range prospects include more complex, supervising-type systems capable of controlling entire "pushbutton" plants.

(3) Objective evaluation of control computers' present status is difficult because of the secrecy maintained by pioneering users.

One area in which agreement is noticeably lacking is the scale on which computer development can be reasonably expected to justify its costs. Each processing company must decide for itself, say the experts. And management's viewpoint is the all-important key to this decision.

Buildup: Many CPI firms have taken a liberal attitude toward control computers, on the premise that the potential of this new technology justifies a rapid and early start on amassing know-how. Some of these companies, says Otto, are quite willing to back initial installations on the basis of expected over-all research benefits.

One disadvantage of this approach, he states, is the need for an exacting

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appraisal of the real benefits obtained from a computer installation—especially if hoped-for research benefits form a substantial part of the original justification.

Suggested rule of thumb: research money for the support of early computer installations should not exceed about 25% of the total expenditure. Research support shouldn't be carried too far, Otto cautions. "Sooner or later, computer control will have to stand on its own two feet," he declares.

Bearish Outlook: Although few—if any—of the "bears" dispute the long-range potential of control computers, they stress their reluctance to make a hasty entry into process automation. These chemical companies, says Otto, prefer to spend research money on new-product development and to leave control-system development to the computer manufacturers. Their reasoning: it will be easier to buy computer know-how than to purchase new-product information.

The policy of giving priority to product development further limits computer-control opportunities, says Otto, by restricting computers not only to economically justifiable applications, but also to those which cannot be technologically improved by other means. This stimulates process improvement, but may delay the coming of large-scale computer-control installations.

Hall explains bearish management policies by comparing control systems' current status with that of the highly touted data-processing systems that preceded them. Despite the lack of factual evidence to support data processing's glowing advance notices, many companies hurried to invest in expensive equipment, training programs and trial operations. Their less-than-spectacular—and in some instances, painful—early experiences have served as a lasting object lesson.

And even the highly competitive computer industry seems to favor the evolutionary development of control systems. Computer makers are shying away from too-radical applications which might damage their products' record of successes.

What to Control: Hall cited three examples of process improvement studies, two of which pointed to equipment redesign or changes in operating techniques as the most economical course of action. The third typifies process-control conditions amenable to the systems approach. Cases in point: the process involves multiple units operating in parallel; the computer is required to "remember" the status of each unit at all times; control is accomplished through computation of gradually changing composition resulting from operating variations; controllable variables of each unit are manipulated according to the calculated changes in uncontrollable variables to make the over-all system produce the required quantity of material at maximum over-all yield.

Otto outlines similar requirements for early control installations, adds that likeliest applications will involve large-volume processes. The ideal: a recent plant making an established product line with a predictable sales picture; a well-defined, well-instrumented process, probably consisting of several parallel operating units which make it difficult — if not impossible —to achieve economic optimization by human control alone.

The two computer-controlled plants vying for the distinction of being "first in the CPI"—Monsanto's ammonia plant in Luling, La., and B. F. Goodrich Chemical's vinyl chloride monomer plant at Calvert City, Ky. (*CW Technology Newsletter, Jan. 16, p. 61*)—meet these qualifications. Since both are still in startup stages, however, neither company has revealed operating details or the breakdown of hoped-for returns on these computer investments.

The major area of computer-control payoff, predicts Otto, will be the achievement of the continuous economic optimum point in processing. In addition, data-logging benefits may constitute a third of the necessary justification. Under such conditions, small computers for batch or semi-continuous processing can be expected to pay out in less than a year; complete process-control systems, in about two years.

Better measurement and control through automation is one way to achieve higher production efficiency in the competitive petroleum and chemical industries, said ISA keynoter Tom Wherry, of Phillips Petroleum. But the cost of developing the necessary control science must ultimately be balanced by management's primary standard—economic return.

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Refractory Alloying

Metal processors this week are looking into a new alloying technique that incorporates high-melting refractory metals into aluminum and other base metals. It's a one-step process that's said to reduce material costs, lower alloying temperatures and permit continuous operation.

The process, developed by metallurgists Ernest Nossen and Roy Parks, and patented by Alscope Explorations, Ltd. (Passaic, N.J.), is intended primarily for the production of master alloys — e.g., aluminum of 5-40% titanium content for use in the production of low-titanium (0.5%) aluminum alloys.

Conventional alloying practices require heating the aluminum, which melts at 660 C, to the melting point of titanium — 1800 C. Nossen's process, on the other hand, operates at lower temperatures, minimizing heating requirement and metal losses attributable to high-temperature oxidation and vaporization.

Combination the Key: The new route is based on a combination of two metallurgical techniques: (1) reduction of refractory oxides by reactive metals; (2) use of molten-salt solvents for the removal of secondary oxides formed by the reduction. Here's how it works:

In the production of titanium-aluminum master alloy, titanium dioxide is added to molten aluminum, which reacts in stoichiometric quantities to reduce the oxide. Resulting finely dispersed titanium partakes in formation of the alloy, which sinks to the bottom of the crucible and can be withdrawn continuously.

Aluminum oxide formed by the reduction reaction is removed from the melt in molten salt (e.g., cryolite), which is added continuously together with the refractory oxide. The cryolite flux is withdrawn from the top of the melt and, if desired, can be processed by standard electrolytic techniques to regenerate cryolite and metallic aluminum for recycle.

Alloys of other refractory metals—zirconium, molybdenum, chromium, manganese, vanadium — may be similarly produced, says Nossen, by selecting a suitable molten-salt solvent for by-product oxide removal.

Alloying refractory metals at temperatures below their melting points

isn't a new idea. Another such method was proposed a few years ago by Mencro Chemical & Metallurgical Corp. (North Tonawanda, N.Y.). Mencro's approach involved the addition of titanium chloride, which is reduced by aluminum to form the alloy and aluminum chloride. The latter product passes out of the molten metal as a vapor, may be recovered.

Mencro has applied for patents, but reports that it has made little use of this alloying technique. Methods employing additions of double fluoride salts have also been used, but aren't suited to large-scale production.

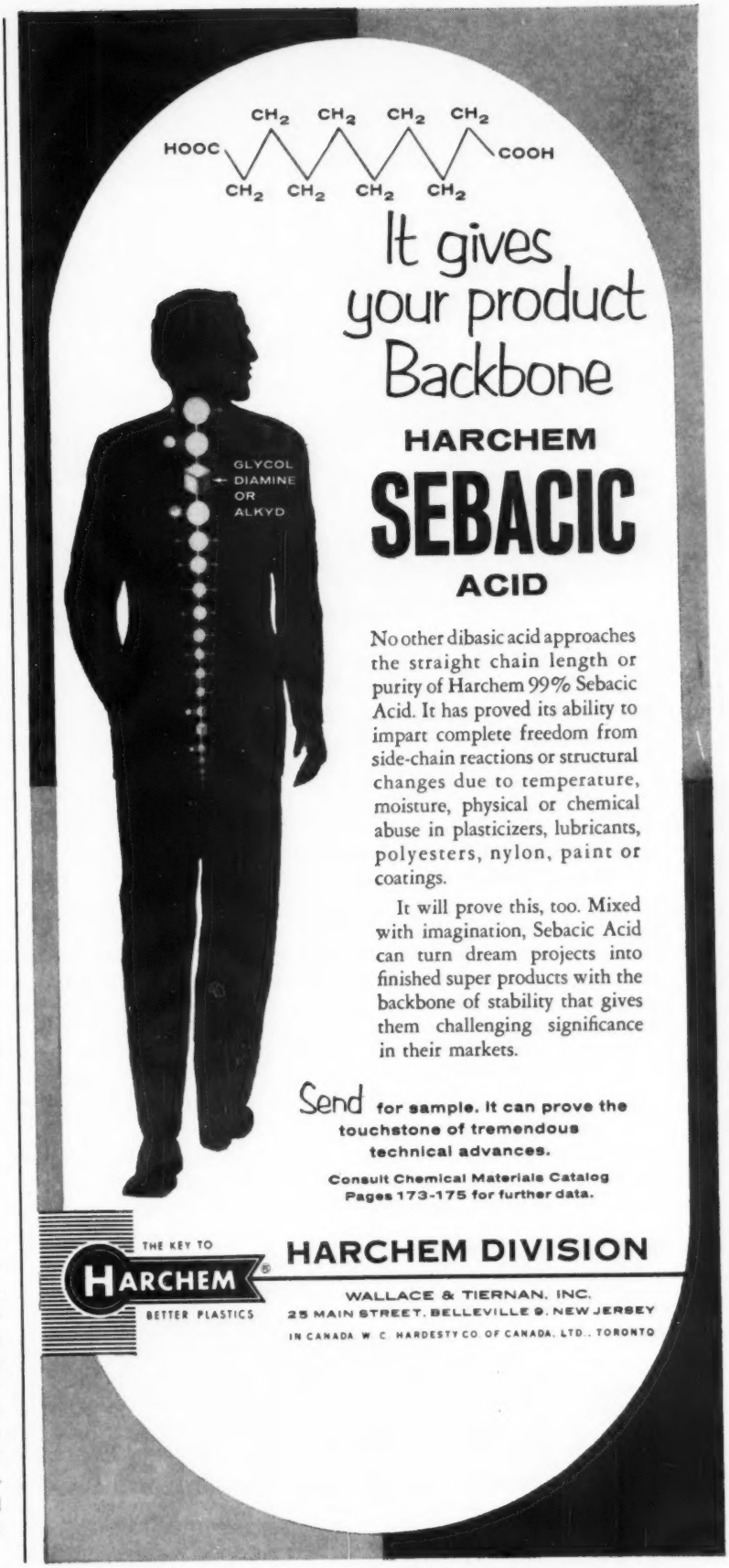
Cost Cuts: Obvious operating advantages stem from the use of relatively low temperatures and simpler equipment. Reduced material cost is perhaps the most important strong point of one-step alloying. In the production of 20% titanium-aluminum alloy, for example, use of titanium dioxide at 50¢/lb. gives a material cost of about $3/lb. The same alloy produced from titanium metal at $2/lb. gives a material cost of about $6/lb. In practice, however, master alloy producers use titanium scrap priced considerably below virgin metal or sponge, thereby minimizing the actual material cost differential.

PROCESSES

Giant Plastics: Polyethylene pleasure boats, 500-gal. tanks, and furniture seats may soon be available, made by a novel molding process. Spencer Chemical Co. (Kansas City, Mo.) has obtained U.S. rights for a thermoplastic molding process (named after its inventor, Thomas Engle) which is, according to Spencer, adapted to forming hollow articles of almost "unlimited" size. The company plans to construct a pilot plant at Orange, Tex.

•

Concentrated Nitric Acid: Pintsch-Bamag AG. (Berlin) has added a new wrinkle — two-column distillation — to nitric acid purification. A major problem in production of pure nitric acid is a water-nitric acid azeotrope containing 68.8% nitric acid. Changing distillation pressure breaks the azeotrope. P-B's first column distills off the azeotrope at atmospheric pressure; the second column separates the azeotrope into water and 99.5% acid at 150-mm. mercury. The process has been patented.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Here are typical Permobond applications installed by two applicators:

•Kaiser Aluminum & Chemical Corp. (Mulberry, Florida). Huge 100,000 gallon acid-storage tanks lined with Permobond by the applicator, Rubbercote, Inc., Bartow, Fla. The redwood tanks previously used for storage of hydrofluosilicic acid deteriorated rapidly, sprang costly-to-stop leaks, lasted for only 2½ years. Permobond®-lined tanks are expected to last from 15 to 20 years.

•The dredge "Markham", built for the Corps of Engineers, U. S. Army, will work on the St. Lawrence Seaway. *Its 42" diameter pipes and the main propeller shafts are protected with Permobond.* Permobond will provide longer life for pipes and shafts. Maintenance will be low, efficiency high. Avondale Marine Ways, Inc., New Orleans, Louisiana, both built the dredge and applied the linings.

Many companies in basic chemical manufacturing or chemical processing have for years been profiting from the unique protection of Permobond on equipment both large and small, simple or complex. They have found it to be their best protection against chlorinated brine, muriatic acid and sulphuric acid. Permobond-serviced equipment will withstand temperatures up to 200°F.

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CHEMICAL WEEK
February 13, 1960

Rocket engines with the largest total impulse and thrust now conceivable may be possible through engine designs worked out by United Research Corp. (Menlo Park, Calif.). Million-pound thrust units can be made at a fraction of the cost of comparable liquid engines, URC says. The URC rocket will use any of the standard solid fuels now available, but additional research on a "tailor-made" fuel is under way. This work is described by URC as "nothing radical."

URC Vice-President Herbert Lawrence says the design innovation utilizes "power units that are rocket-building segments of unique design. These virtually eliminate the handling and ballistic problems that formerly plagued large solid motors." Although not a variable-speed rocket, speed can be programed prior to blast-off by modifying the power units, Lawrence says.

Production of the rocket will be on a prototype basis at URC's new San Jose facility. But United Aircraft's Pratt & Whitney subsidiary plans to have multiple production capability by the time the first prototype engine is built.

The firm is also working on storable liquid propellents, as part of its recently stepped up R&D program—expected to cost $12 million in the next two years (*CW Technology Newsletter, Jan. 9*).

•

Aero-jet General outlined plans for sectional solid propellents last week, will propose this system to the Air Force. E. R. Roberts, Aerojet's manager of research and development, described it as a high-thrust solid-fueled booster, made in sections transportable to launching sites by present methods. Each section would provide about 1 million lbs. of thrust. Aerojet reports that the principle of sectionalized solid fuel has been proved in small-scale test firings.

•

Miami's program of orally administered polio vaccine has begun, will treat 52,000 Dade County residents under 40 years of age. Lederle vaccine previously tested in Latin America and Minnesota is being used. M. John Hanni, executive secretary of the Dade County Medical Assn., tells CHEMICAL WEEK that tests and analyses planned for the program include blood testing of 5-7,000 recipients before and after vaccination. Hanni expects most eligibles to turn out voluntarily, says, "We have every reason to expect great public reception." The vaccine is free; University of Miami students started getting it last week. Hanni says the Dade group picked Lederle vaccine "because it was available when we needed it."

•

Chemical clues to successful skin grafting are emerging from research reported at a New York Academy of Sciences meeting last week.

The work could lead to use of injections to build up the ability of prospective skin or kidney (or other organ) graft recipients to tolerate grafts.

Sensitizing substances (antigens) cause failure of grafts between the same species of humans or animals, according to Fritz Albert of the University of Liege (Belgium) and H. S. Lawrence of New York University School of Medicine. Extracts from skin cells and white blood cells carry the antigenic (sensitizing) substances to the new recipient.

•

A new crystal-growing technique that may boost molecular electronics development (*CW Technology Newsletter, Jan. 30*) was unveiled this week by Merck & Co. (Rahway, N.J.). It involves the formation of single-crystal silicon junction layers, in complex configurations, by direct deposition from the vapor phase. Key: introduction of controlled impurities during the vapor-phase crystal-growing operation.

Merck scientists John Allegretti and Donald Shombert report that the new method permits close control of resistivity, thickness (layers 0.0001 in. and up) and other critical requirements. Merck's goal: to supply semiconductor materials having junction configurations that are difficult to fabricate by conventional alloying and diffusion techniques.

•

Argon octafluoride may be a rocket-fuel oxidizer of the future. Advantage over fluorine: no refrigeration needed. Recent theoretical calculations at Midwest Research Institute (Kansas City, Mo.) show that the compound should be a liquid with many physical properties similar to water. And it has more fluorine available to give it punch than fluorine compounds such as chlorine trifluoride. Problem: how to put the theory to practical test. John Barger, head of MRI's inorganic chemistry section, says his group believes it can make argon octafluoride but needs a sponsor.

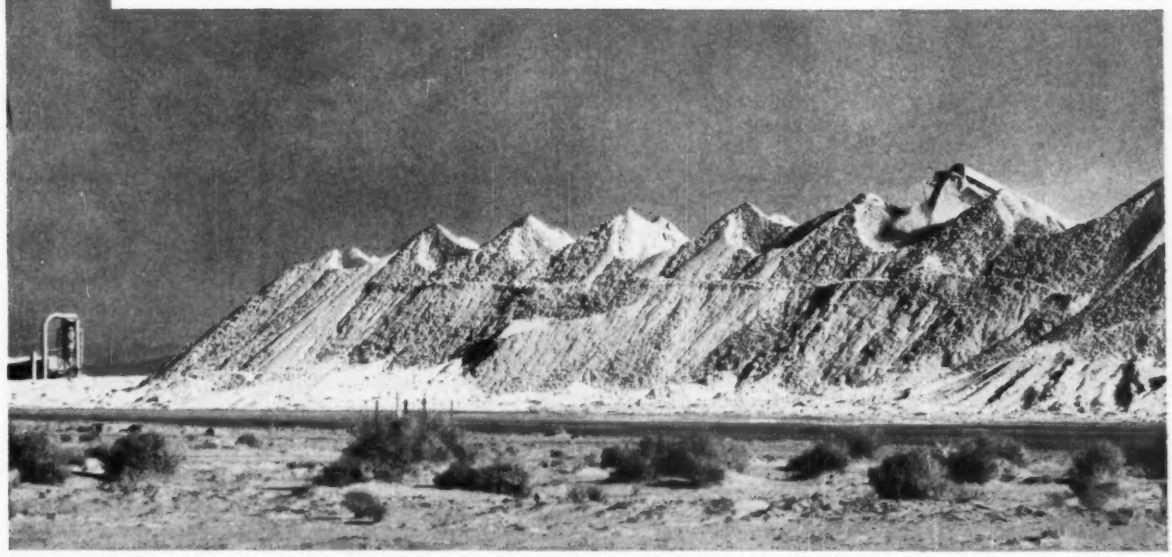
•

Up to 100,000 gal./day of fresh water is now flowing from the sea-water conversion plant placed onstream last week at Southern California Edison's Mandalay Beach power plant (near Oxnard, Calif.). The $250,000 unit is slated for a three-year pilot operation to evaluate the efficacy of multiple-effect evaporation (the unit provides 26 stages of flash distillation) utilizing waste or low-grade power-plant steam. Designer-builder Cleaver-Brooks foresees similar, 5-10-million-gal./day plants.

•

Rare-earth metals may hold the key to thermoelectric power generation at high-temperatures. At last week's AIEE meeting in New York, Westinghouse's S. J. Angello predicted that materials based on rare-earth metals will boost present operating limits of thermoelectric systems. Such a development would brighten the prospects for generating electric power directly from nuclear heat.

U.S. Borax makes a mountain out of a hole mill...



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Every one of our many boron products has its beginning at this huge primary crushing mill. Thousands of tons of raw borate ore, coming direct from the mine, are crushed daily and carried to the stockpile by conveyor belt in a continuous stream.

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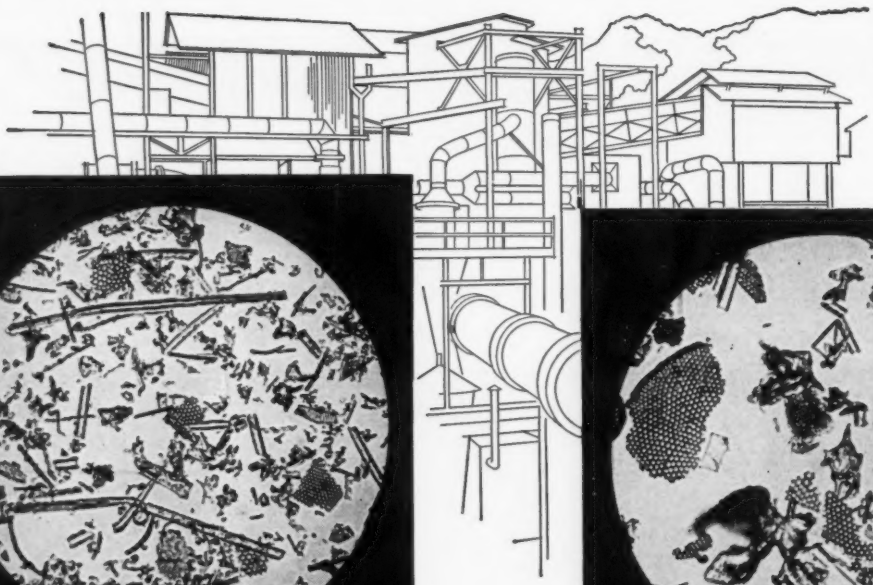
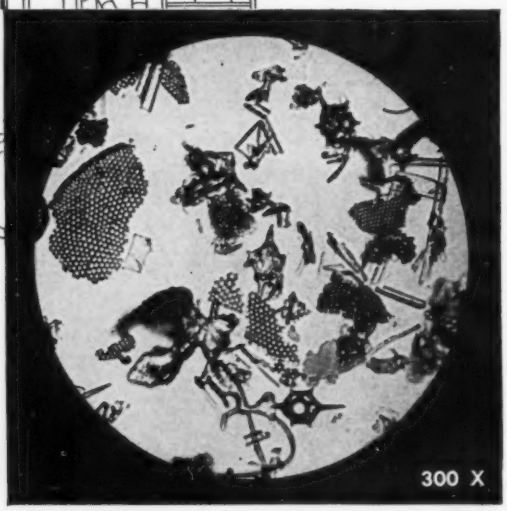


Milling and calcining equipment used for all Celite grades.

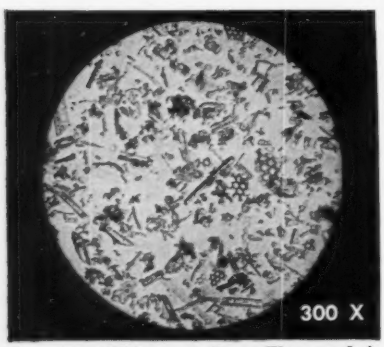
For high-clarity filtration of most liquids—use this specially milled diatomite, Hyflo Super Cel.



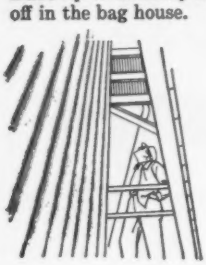
For filtration of larger suspended particles—Celite 545 combines maximum clarity plus faster flow rates.

In diatomites, Johns-Manville precision processing works for you

Constant uniformity in every grade of Celite assures consistent results, less down-time



For mineral filler use—Super Floss grade is made up of carefully sized fines air-floated off in the bag house.



Typical J-M bag house equipment.

As the microscope shows, each grade of Celite* diatomite has its own distinctive particle size distribution. Yet no matter where or when purchased, each remains uniform from bag to bag—your assurance of top production results with minimum down-time.

Three examples of flux-calcined Celites are shown here. Hyflo® Super Cel is widely used for filtration in many industries. It has just the right combination of coarse and fine particles to assure optimum clarity and flow rates. Celite 545, with a higher percentage of coarse particles, is used to achieve maximum clarity and faster flow rates with liquids that have larger suspended particles.

Super Floss, one of several bag house grades, has fine particle size distribution. A white powder, it is processed within very narrow tolerances (less than 1% retained on 325 mesh). It is a popular filler in fine products such as silver polishes.

Johns-Manville can precision-produce so many different grades of Celite because it mines the material from the world's largest and purest commercially available deposit. For assistance with specific filtration or mineral filler problems, talk to a nearby Celite engineer. Or write direct to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

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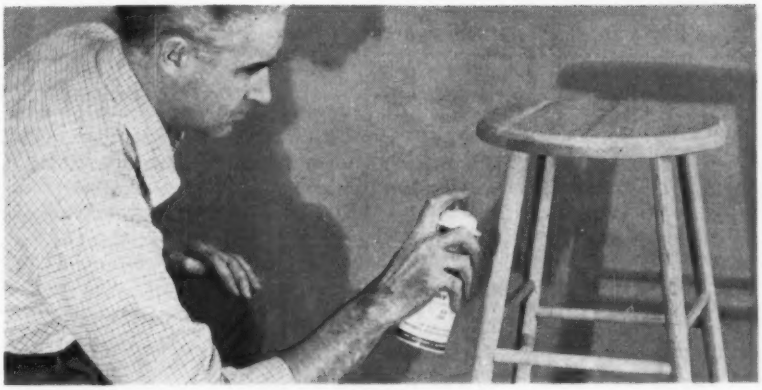


Home painters find pushbutton paints are simple to use, can be applied to many objects that are difficult to coat with conventional paints.

Pushbutton Paints Set Fast Profits Pace

Thanks largely to the convenience they offer, spray paints are the fastest-growing segment of the entire aerosol field. Sales this year: some 85 million cans—a retail market of nearly $111 million for paint producers, propellent suppliers, custom fillers, and other specialties makers.

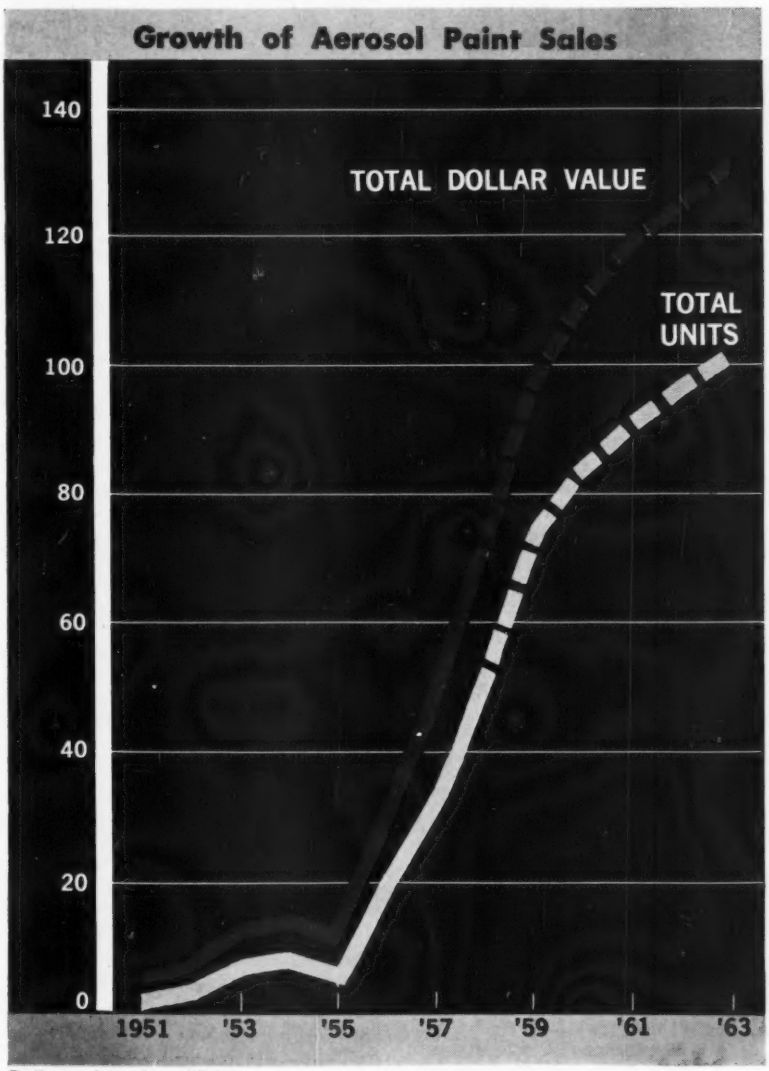
Whereas 160 million gal. of brush-on paint are sold each year to homeowners, aerosol sales account for less than 3% of that, about 4 million gal. But the aerosols are creating new uses of their own—e.g., hard-to-get-at objects (radiators), messy jobs (wicker furniture), small objects (toys), lawn mowers, etc. They are also practical for touch-up jobs, particularly on cars.

The chief advantage—and big selling point—is ease of application. Women users, particularly, are happy to avoid sloppy rollers, brushes and turpentine.

The sprays aren't intended to replace paint customarily used for coating large areas—size and price of the sprays make that uneconomical and impractical. But one big propellent producer estimates that aerosols will eventually capture nearly all sales of ½- or ¼-pt. standard cans and 50% of the pint sales.

By '63, 103 million or more cans, worth over $133 million, will likely be sold.

Who's in the Market: More than one-third of the 300-400 top paint-makers are in the aerosol business. A CHEMICAL WEEK survey of some of them found that most agree that aerosols in general are a big growth



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Considered a real "breakthrough" by many leather finishers, Polyvinyl Chemical's W-63 polymer emulsion series offers the features needed to meet the marketing challenges of the 60's.

To leave films of sparkling clarity, W-63 emulsions are highly translucent and of very fine particle size. For formulation ease, they show excellent compatibility in blends with casein, shellac, waxes, dyes and pigments.

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area in total paint sales, but differ on the question of the sprays' importance to over-all sales. As percent of sales, aerosols are small items for the big paint manufacturers. But for smaller companies, many of whom were pioneers in the field, spray paints constitute 50-100% of their business.

Krylon, Inc. (Norristown, Pa.), turned out the first aerosol coating, a clear acrylic, marketed in '48.

The earliest pigmented aerosol coating is generally attributed to Seymour of Sycamore (Sycamore, Ill.) in '49. Other marketers and loaders followed shortly—Minit Spray Corp. (Park Ridge, Ill.), Sprayon Products, Inc. (Cleveland), Chase Products Corp. (Broadview, Ill.), DeMert & Dougherty, Inc. (Chicago), and Illinois Bronze Powder Co. (Chicago).

It wasn't until '56, however, that the big paint companies entered their products — Sherwin-Williams Co. (Cleveland) and The Glidden Co. (Reading, Pa.). Du Pont (Wilmington) came in in '57.

What They're Doing: Seymour of Sycamore recently abandoned its conventional paint line, switched its entire operation to aerosols. The firm distributes all over the world, except in Europe.

Patterson-Sargent Co. (Cleveland) has been in the field five years—forced in by competition. But aerosols are a very small percent of its business. Its line consists of 11 colors; two others are to be added soon.

W. P. Fuller & Co. (San Francisco) has been marketing sprays eight years in 11 Western states and parts of Latin and South America, does about $30,000/year in aerosols, compared with $9 million in its regular paints.

For Sheffield Bronze Paint Co. (Cleveland), enamel sprays make up 50% of its business. The company figures it's a growing sales area, that problems are not much different from those in its regular paint line. Its 22 spray shades match standard paint colors.

Sherwin-Williams, largest paintmaker of all, says that aerosols are not a significant part of its business. S-W carries nine spray colors (only two match conventional lines); flat black and aluminum are its biggest sellers. S-W predicts the trend will be to multicolored sprays, but has no plans along those lines.

Du Pont's line of aerosol enamels includes 15 colors. In about two months it will add a new marine varnish called Ultra V, plus another complete line later in '60. (Du Pont's Freon is used as a propellent in many spray paints.)

Krylon, Inc., with an aerosol enamel line of 24 colors, believes the trend is to fewer enamel colors because dealers are reluctant to stock too many. Krylon is convinced that the 16-oz. spray can is here to stay; it figures that 50% of paint buyers are women, who like easily maneuverable packages.

Plasti-Kote, Inc. (Cleveland), sells only aerosols, packages more than 200 shades. Its recent progress includes addition of a new tamper-free seal on its aerosols, and expansion of sales in Europe.

With the exception of Krylon, Sprayon, Sargent-Gerke and a few others, paintmakers and marketers do not have facilities for filling their own aerosols. Most big custom-fillers have been slow to enter this phase of the business, fearing that the process of filling paint would be too messy. But rising sales of spray paints are changing this attitude.

Few Technical Problems: Most spray-paint technical bugs have been eliminated, leaving only a few problems no more bothersome than those encountered with use of conventional enamel paints. Valves are constantly under test and, although major clogging problems have been licked, all companies are optimistic about development of a better valve.

Most remaining problems are caused by improper application of the aerosol by users, but they're being solved by paintmakers' consumer education programs. In fact, most companies report that their main problem is misuse of the can itself. (Correct method of handling the can after use is to turn it upside down, release some of the propellent, then store upside down.)

Manufacturing paint for aerosols, although no longer a problem, involves a great deal more than mixing an existing paint formula with propellent, as some companies discovered the hard way in the early days. An aerosol paint formulation, which must be built from the ground up, has a lower solids content and higher percentage of solvents than a conventional paint —45-55% of an aerosol paint is fluorinated hydrocarbon (about 40 million

Progress Report...

Water-soluble gum takes up where nature leaves off

One of the most adaptable of the synthetic water-soluble gums is CELLOSIZE hydroxyethyl cellulose. This white, fluffy-to-granular powder is non-ionic and readily soluble in hot or cold water. The various grades have many applications in a wide variety of industries.

Paint-Making Timesaver...

In latex paints, CELLOSIZE WP-4400 has high thickening power at low concentrations. It is also soluble and non-gelling in water at temperatures up to boiling. You can add WP-4400 to pigment grinds and still obtain instant color development during hot let-down with phthalo colors. The ease of solution and low-foaming characteristics of WP-4400 speed preparation of latex paints.

Latexes thickened with WP-4400 exhibit good shelf life, stability to pH variations, and freeze-thaw resistance. Clean, bright colors are assured, with little tendency to form pinholes in the film. Other desirable properties are viscosity stability, excellent flow-out, and good scrub resistance.

More Paper Strength...

Preliminary tests show that paper products such as towels and tissues gain in wet strength, absorbency and softness when treated with CELLOSIZE HEC and glyoxal. This also suggests evaluation with non-woven fabrics. Coatings made from HEC are impervious to both liquid and vapor forms of oils, greases, and most solvents. Fiber containers lined with a film made from CELLOSIZE HEC have held lubricating oil, ethylene dichloride, and other hydrophobic solvents without leakage for two years.

Paper sized with CELLOSIZE HEC has excellent gloss and hold-out for oil-based inks, varnishes, and lacquers. Only about 0.1 to 0.5 pounds of the gum per 1000 sq. ft. of paper is usually required for this purpose. Cooling the paper to prevent gelation is not needed.

CELLOSIZE HEC used as a textile finishing size contributes stiffness with less solids, better heat stability, and easier preparation than the usual starches. Soil removal from ironed fabrics is also greatly facilitated.

Hydroxyethyl cellulose is being used in textile emulsions where solution stability and good dilution stability are desired.

Smoother Cosmetics...

As a binder, thickener, stabilizer, and film-former in cosmetic preparations, CELLOSIZE HEC is unexcelled. Its ease of solution and efficient thickening ability are time-savers in formulating shampoos, creams, and lotions. Tolerance for concentrated aluminum salts makes HEC ideal for deodorant creams, lotions, and sticks. The chemist may compound with either anionic or cationic additives without coagulating the system. Lubricity and pleasant "mouth feel" are imparted by CELLOSIZE HEC to many pharmaceutical preparations.

Ceramic Color-Dispersant...

In dry-molding ceramics, this CARBIDE non-ionic gum is a useful binder and water-retaining agent. It produces powders that contain enough moisture to be plastic under pressure.

Luminescent pigments, such as used for coating instrument dials, and other ceramic colors are effectively dispersed with CELLOSIZE HEC. The non-ionic serves as both dispersant and binder for the pigment-glass flock material sprayed on colored glassware and later fired.

There are many more applications for CELLOSIZE HEC. Its high thickening efficiency and compatibility with borates facilitate the formulation of adhesives. Coating rubber or plastic goods with a solution containing CELLOSIZE HEC prevents sticking and protects them from marring during processing. Agricultural sprays, dusts, and wettable powders can be efficiently prepared with CELLOSIZE HEC. Its colloidal action is of value in electroplating solutions, giving a brighter finish to metal, particularly in cadmium plating.

More Information Available...

Further information on CELLOSIZE HEC—properties, where and how to use it, plus other valuable data—can be obtained from a Technical Representative in any CARBIDE office. For a technical bulletin listing many suggested applications, please mail the coupon.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

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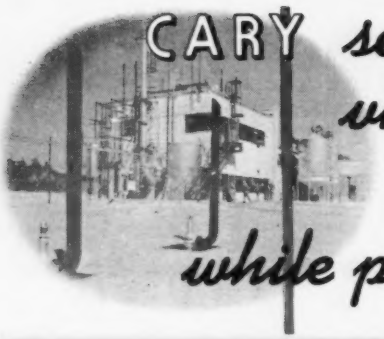

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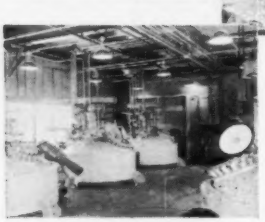

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lbs. will probably be used this year).

What's Ahead: Some of the things home paint users can look forward to in the next few years are more colors, easier application, and more specialty products—e.g., multicolored and textured paints.

Price of the better-quality enamel sprays will remain in the $1.69-$1.89 range for a 16-oz. can, somewhat higher for specialized products such as fluorescent paint. Water-based paints—when they appear—will be more economical.

Only a few companies have attempted to market a multicolored paint, among them Benjamin Moore Co. (New York), which brought out MorFlek last July. A rubberized vinyl, the product is a semi-water-based paint, contains no lacquer solvents, is odor-free, dries quickly to a washable finish. Kerr Chemical Co. (Des Plaines, Ill.) introduced its Kerrpro Multicolor Spray (16-oz, can for $2.25) last week. Color names tend toward the exotic—e.g., April Yellow, Summer Dusk, Rainy Day.

A true water-based paint is still a goal of research (in MorFlek, water is used mainly as a dilutant), though many paint people do not see the necessity for one. Nevertheless, when problems such as corrosion and compatibility with the propellent are solved, a water-based product is certain to appear, probably this year.

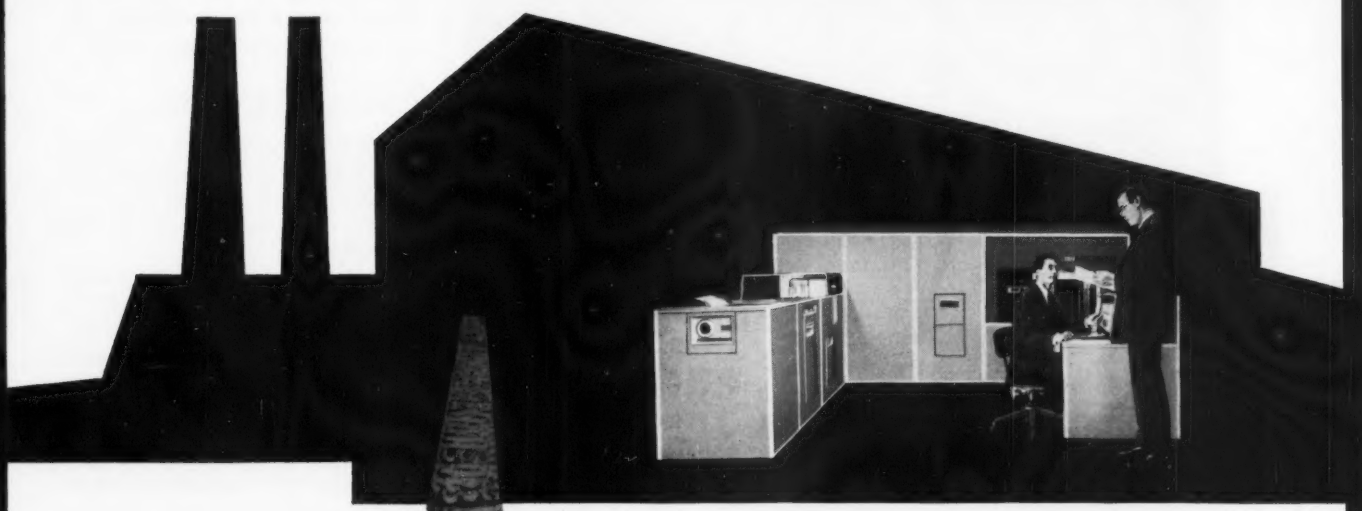
Wrapped in Fragrance

The new consciousness of smell has spread from the movie makers to the packaging field. Scented polyethylene film for a variety of consumer products has been developed by Fragrance Process Co., Inc. (New York).

Already available are scents said to be like that of clean linen for fresh laundry packages; perfume for packaging women's lingerie and handkerchiefs; woody scents for men's sport clothing; chocolate and spearmint for candy boxes; cookie aromas for cookie and cracker boxes. Pending the Food & Drug Administration's approval for use are an assortment of flavor odors such as orange, potato, strawberry and onion.

Poly-Scent is sold in the form of a resin concentrate, which is dry-blended with U.S. Industrial Chemicals Co.'s Petrothene for extrusion. The concentrate sells for $1.50 to

one late decision on inventory and this $50 part* could cost you $5,000



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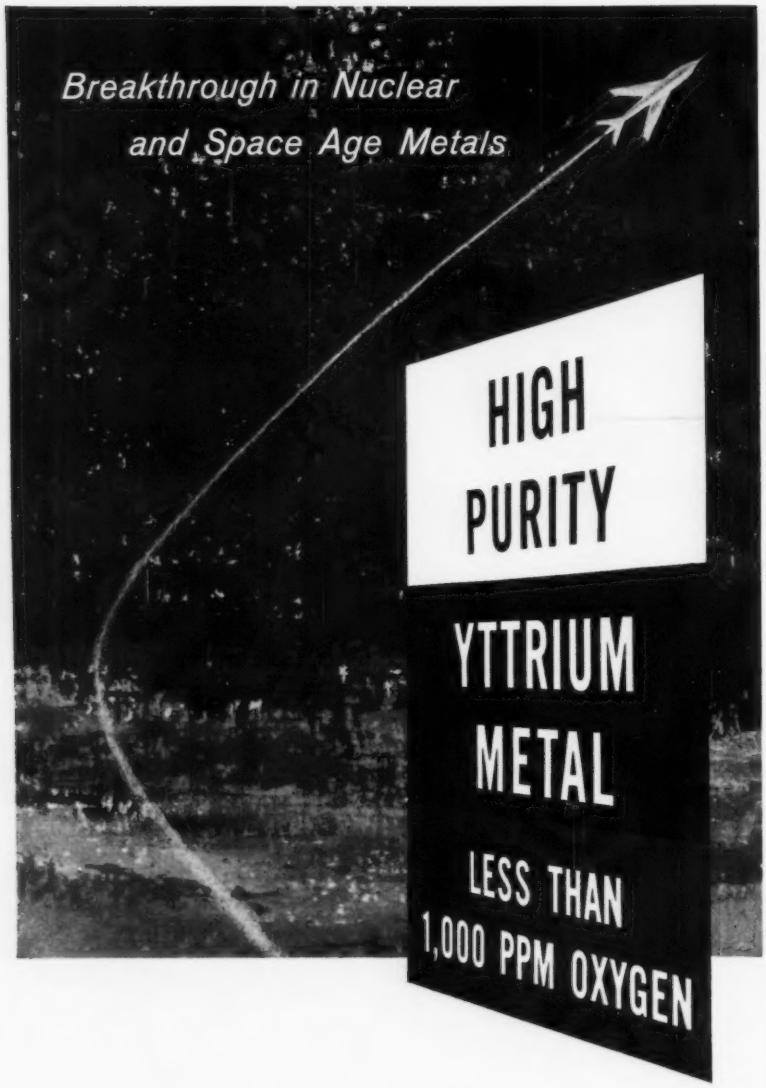

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$5/lb., depending on the flavor.

The aroma is said to become an integral part of the polyethylene film and cannot be washed away.

Charcoal Coating

A new type of "paint" is now on the market. It's an activated charcoal coating, X-21, made by the Barnebey-Cheney Co. (Cassady at Eighth St., Columbus, O.).

Made from finely powdered activated coconut-shell charcoal in an unidentified binder, X-21 can be applied on metal, concrete, stone, plastic, wood, fiber or paper. It gives odor-adsorptive properties to containers, buildings, fabrics and various types of filters, B-C claims. (Biggest markets now are in appliance manufacture, where X-21 is used for filters, air purifiers, conditioners.)

The product is water-soluble, can be removed from surfaces by scrubbing. This permits use in decontamination applications, enables the surface to be restored later to its original finish.

The coating is sold in concentrate, for industrial use only. Container sizes range from 1 qt. to 5 gal. Price: $3-4/gal. The charcoal paint is black, but pastels are achieved by covering the black with a white porous overcoating (also put out by B-C) that can be tinted.

PRODUCTS

Paper Softener: Tanatex Chemical Corp. (Belleville Turnpike, Kearny, N.J.) is selling Cellolube Q-2, a softener for napkins, towels and tissues. An amber "wax" consisting of a nonfoaming aliphatic quaternary ammonium compound, the product is said to provide better sheet formation, improved crepe, and no decrease in tensile strength.

•

Noncorrosive Antifreeze: Olin Mathieson Chemical Corp. (New York) has developed an antifreeze that will not corrode aluminum or other metal engine parts. Formulated in anticipation of wider use of aluminum in '60 models, Permanent Pyro is an ethylene glycol antifreeze said to be suitable for any engine that uses a liquid coolant. A gallon sells for $2.69 over the counter or $3.25 installed.

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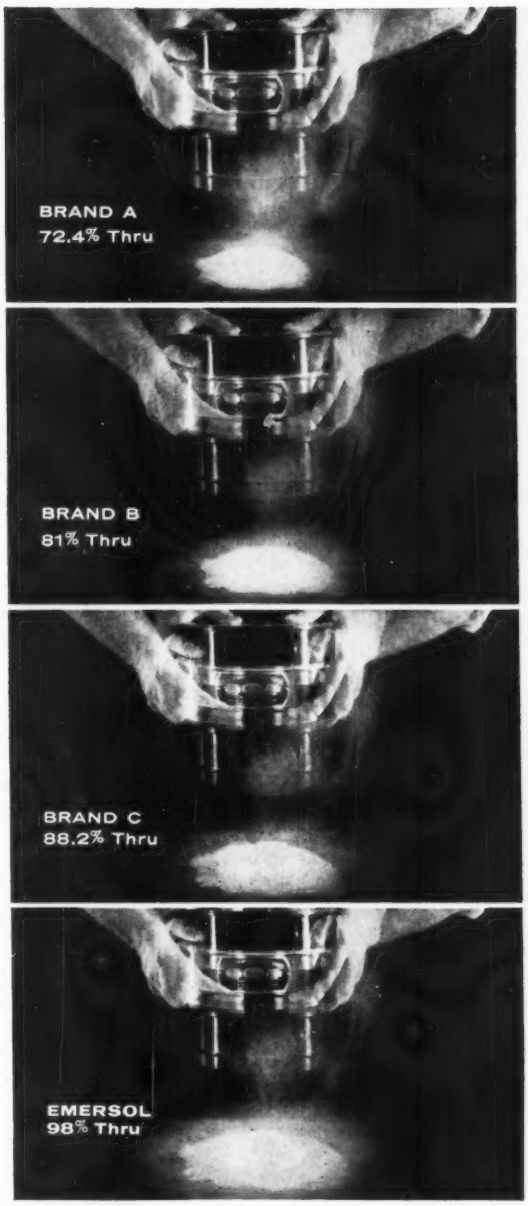

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Existing plants designed and constructed by C & I are represented here by the flags throughout the world. Due to the Earth's curvature, some of the plants cannot be shown.

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Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

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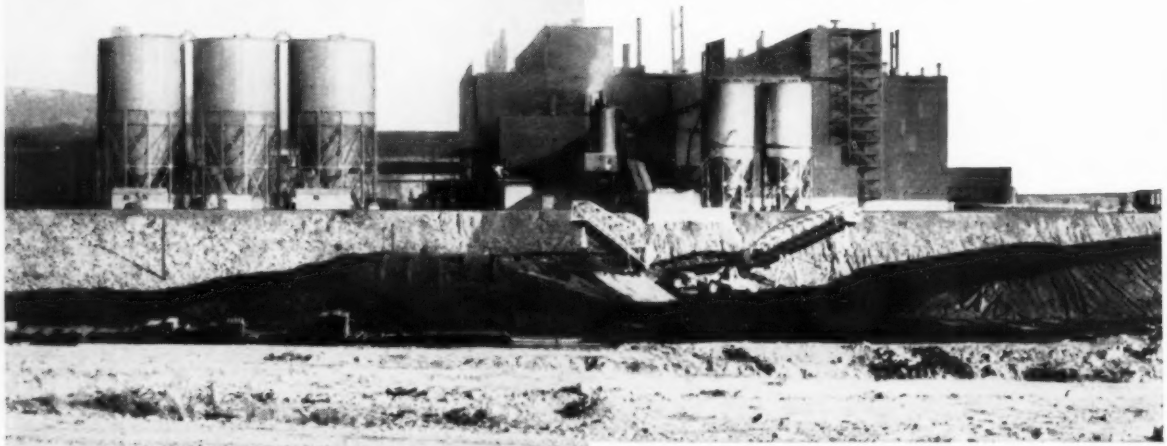

Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

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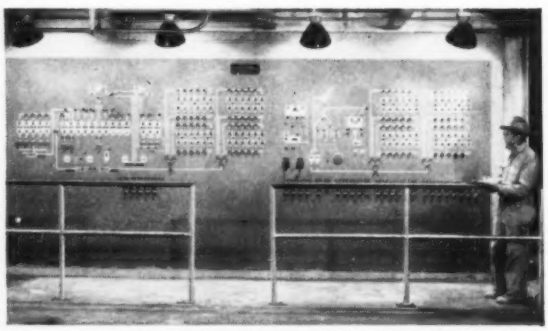

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Borden's Marusi, Commercial Ink's Jacques, sign purchase agreement.

Borden Fills Out the Line

As it has done 10 times before in recent years, The Borden Chemical Co., division of The Borden Co., last Thursday acquired another company. This time it was the Commercial Ink & Lacquer Co. (Fair Lawn, N.J.), maker of gravure inks and lacquers.

For Borden Chemical, the purchase fills out its line of chemical supplies for the paper processing industries. It now produces a broad range of products, from coatings, adhesives and additives, through inks and finishes.

For Commercial Ink, the acquisition solves the problem of raising new money for continued growth.

Postwar Development: The ink company, as Borden's 10th operating department, may bolster Borden's sales by about 5% this year. It will also add two more plants to the list —one in Fair Lawn, where Commercial's headquarters are, and the other in White House, O.

Founded in '46 on an investment of about $90,000, Commercial Ink has grown steadily: current assets in early '58 were about $720,000; sales today are better than $3 million/year. For this going concern, Borden paid an undisclosed price—the deal was transacted through an exchange of stock. Clearly, however, it involved more than the $64,000 outstanding in capital stock and about $28,000 in common that Commercial had in '46.

General manager of the new department is James Wold, former general manager of Borden's Consumer Products Dept. Commercial Ink's President George Jacques will handle the department's sales and Treasurer George Grupe will handle production and development. The firm has some 175 accounts, mostly on the Eastern seaboard, also in the Middle West, Canada and a scattering abroad.

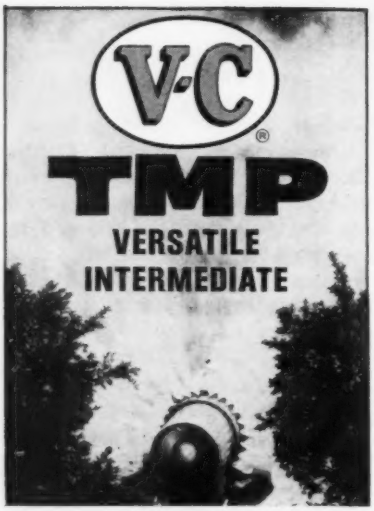
According to Augustine Marusi, Borden Chemical's president, Borden will put about $500,000 into expansion at both locations almost immediately. One objective will be to broaden the Ink and Lacquer Dept.'s base—Borden's polymer chemistry interests should help here.

Borden View: As is evident from Borden Chemical's history — nine acquisitions in 13 years—the ink and lacquer purchase is consistent with the firm's pattern of growth. In recent years, particularly, this pattern has been characterized by outright purchase of chemical firms that could augment Borden's activities or provide nuclei for new interests. The chemical section's expansion technique mirrors the growth pattern of its parent, The Borden Co., which, since '45, has added 37 other companies to its divisions.

Borden Chemical itself started out in 1929 when The Borden Co. purchased the Casein Co. of America. Casein was then marketing cold-water powdered paints, an adhesive used in manufacturing coated papers, and a cold-water-soluble water-resistant glue—all derived from milk. Following this, Borden has, by acquisition, brought into its network phenol-furfural and phenol-formaldehyde resin facilities (Durite Plastics, Inc.); vinyl, butadiene-styrene, acrylic and methacrylic units (American Polymer Corp.); and the resources of four chemical firms that produced products for use by the paint, paper, textile and plastics industries (American Monomer Corp.; Monomer-Polymer, Inc.; American Resinous Chemicals Corp.; and Reslac Chemicals, Inc., all owned by one corporation).

In the area of plastics fabrication, Borden has bought plastic extruders Lawrence Process Co. and Resin Industries. The purchase of Pioneer Latex and Chemical Co. added protective coatings manufacture, while Commercial Ink has brought in ink and lacquer facilities that had been sought for about a year. (Borden figures its acquisitions have accounted for some 30% of its growth, with internal development accounting for the rest.)

New Stature: This activity brought about—in '58—the elevation of the



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MOLECULAR WEIGHT	124.08
APPEARANCE	colorless liquid
BOILING POINT	108-108.5°C
SPECIFIC GRAVITY, 20°/4°C	1.046
INDEX OF REFRACTION $n_D^{25°C}$	1.4056
FLASH POINT, Cleveland Open Cup	100°F
POUR POINT	<−75°F
TOXICITY (Single oral dose—rats—LD_{50}) in mg/kg	2000

SOLUBILITIES: Insoluble in water, soluble in hexane, acetone, benzene, ethyl alcohol, ether, carbon tetrachloride, kerosene and mineral oil.

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Chemical Division to full company stature, effected the more recent election of Marusi to the board of directors of The Borden Co. And the rapid pace may well continue: in its five-year-outlook, recently served up to the board of directors, Borden Chemical anticipates that by '65 sales will be up some 200% over present levels.

Pinning down what those present levels are is not easy. Never outspoken on internal affairs, the company has seldom revealed much about the contributions of its various divisions. Some points of departure can be determined, however.

Early in '57, for example, Borden President Harold Comfort stated that sales of chemicals for '56 were about $39 million, up 34% (from an estimated $29 million) from '55, or about 4.5% of total company sales. Later, in the company's annual report summarizing '57's results, "chemical operations sales rose 12% and accounted for almost 5% of total sales." At the 12% figure this would put chemical sales at about $43.7 million for '57, although applying the 5% figure to Borden's total sales of $931.2 million would bring it closer to $46.5 million, the figure the company confirms.

As to current sales, Borden Chemical reports more than a 200% increase since '54. Although it won't give a dollar figure, Borden stated that in '54, 2.8% ($21.8 million) of its sales of $776.8 million came from chemicals. A 200% hike since then would put '59's chemical sales at better than $65 million.

Lining these figures up on a yearly basis points to Borden's remarkable growth pattern, averaging out to about a 23% yearly sales increase. Simultaneously, profits have increased an estimated fivefold since '54.

Organization: Borden Chemical breaks its operations down into 10 operating departments, including the new Ink & Lacquer Department. The other nine: Coatings and Adhesives, Consumer Products, Polyco Monomer (mainly making acrylic and styrene resins and butadiene-styrene emulsions), Resins and Chemicals, Western Operations, Polyvinyl Chloride, Resinite, Casein, and International. PUC and Resinite are paired, as are Casein and International, with a general manager each. The West Coast Operations Dept. is both a sales and production arm, handling products of the other divisions west of the Rocky Mountains.

Together, Borden reports, its PVC, Polyco Monomer, and Resins and Chemicals Departments, plus sales of the West Coast Operations Department, account for some 60-70% of total chemical sales. Against a total figure of $65 million this would amount to something like $43 million/year. If West Coast Operations' share of these departments' product sales are tagged directly onto department sales, PVC, Polyco Monomer and Resins and Chemicals account for 50-60% of total chemical sales, about $36 million.

In addition to its 18 plants and 13 laboratories in the U.S., Borden Chemical is extremely active internationally, with operations in Canada, Argentina, Colombia, Brazil, Great Britain, Mexico, the Philippines and Australia. Although sales from these operations are not included in Borden Chemical's divisional sales picture, they probably are equivalent to about 25% of domestic sales.

Outlook: As in other matters, Borden Chemical is loath to be specific about its future, except to say that it expects by '65 to show a 200% increase in sales. But that figure itself seems to presuppose an annual growth rate no smaller than the 23% of previous years, which itself included gains from the purchase of going companies. It would appear, then, that Borden has no intention of letting up in its search for acquisitions, although it says that such growth will play a small part in future development. Says Marusi, "When we make acquisitions, it's usually in a new field, where people can show us something."

The company expects to press development in the field of polymer chemistry, where it already has considerable strength and resources.

Whatever the specific new field, it's pretty certain it will be consistent with Borden's past progress: new fields of production, remarkable sales growth, quiet development, and no hesitation to acquire what it needs. Best bets of informed observers: look for at least one major acquisition by Borden in the next year, probably outside its well-developed polymer chemistry lines, and greatly increased emphasis on its foreign operations.

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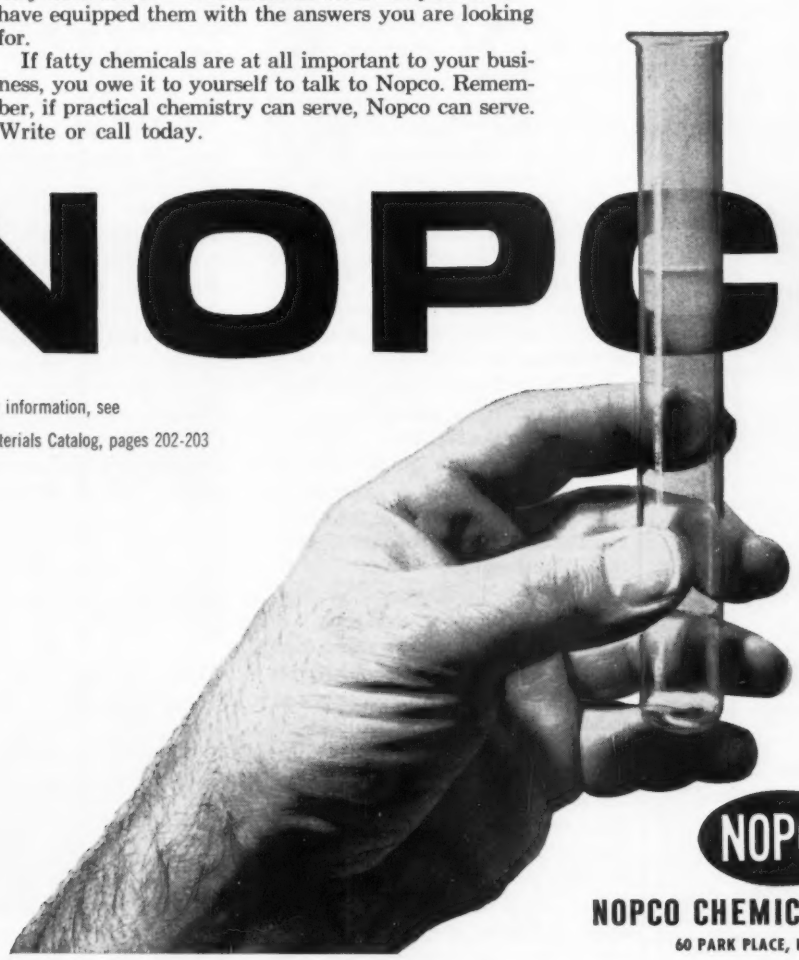
For complete information, see
Chemical Materials Catalog, pages 202-203



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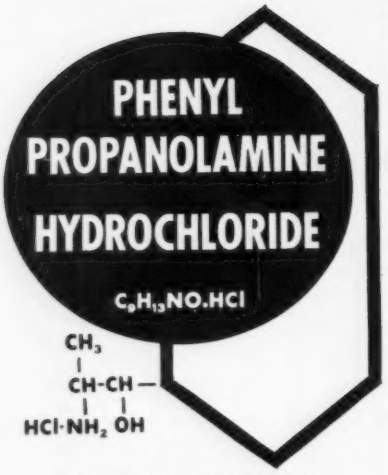

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MOISTURE: 0.5% (max.)

HEAVY METALS (as Pb):
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ADMINISTRATION

Pioneering in Politics

A coalition largely made up of CPI firms last week wound up its first course in political action in New Jersey and set the stage for wider broadcasting of the principles of management's civic responsibilities.

Under the guidance of the New Jersey State Chamber of Commerce's Citizenship Responsibility Program—patterned closely after that of the U.S. Chamber of Commerce—nine industrial firms near Rahway combined forces to train management men in the ins and outs of practical politics. Last week's exercise was the graduation of the first class.

The group was composed of men from Metal & Thermit Corp., American Cyanamid, American Metal Climax, Foster Wheeler, Westvaco Mineral Products Division of Food Machinery and Chemical Corp., Plastics Division of Koppers Co., Purolator Products, Allen Industries and New Jersey Bell Telephone. It was largely organized through the efforts of Metal & Thermit's director of employee relations, John Saracino. He believes it's the first time that such a course has been given in joint in-plant seminars to representatives of a number of different companies. M & T provided the facilities for the nine weekly meetings.

Phase Two: Second phase of the effort is for each of the trained men to evaluate the course, and, if they see fit, to recommend that their managements make it available to their own employees. This phase, however, is not fully crystallized: some of the men CHEMICAL WEEK interviewed attended independently and their companies have not yet proposed a policy on civic affairs.

At M & T, however, Saracino hopes to start training soon some 650 salaried and hourly employees in New Jersey, as well as 350 others later on in Virginia, Kentucky, California, and Indiana.

In Koppers' Plastics Division operating in New Jersey, it's probable that about a dozen department heads will participate in the course next, then decide whether to pass the plan on through their departments.

The course outlines the basic principles of the two major political parties of the U.S., sketches their histories, describes their organizations and presents ways and means by which citizens may take more active parts. The nine seminars just concluded covered political party organizations, political precincts, campaigns, political clubs, political leaders' problems, individuals' roles in politics.

In the view of participants, the course was definitely enlightening, and most were stimulated to take further individual steps into the civic affairs arena.

LABOR

Canadian First: Oil, Chemical & Atomic Workers Union has negotiated pattern-setting wage increases in the first settlement since reorganization of its Canadian District Council and the beginning of current bargaining drives. The increases, 24¢ to 35¢/hour over the next three years, were worked out with the management of North Star Oil Co. The contract also calls for additional fringe benefits worth 17¢/-hour. North Star employees are represented by Local 16-600. OCAW expects to use the agreement as a negotiating lever, has recommended that "all petroleum units in Canada bargain promptly for new contracts that would provide no less money" than the North Star agreement. The union also recommended that negotiators seek two-year pacts or less.

•

No Restriction: Colorado's state supreme court has ruled that cities and municipalities may not restrict picketing in labor disputes. The ruling was in a case testing the constitutionality of an ordinance passed by the city of Golden that would have restricted such practices. The court said there is no constitutional provision or statute granting Colorado municipalities the power to regulate labor disputes.

•

Long Strike Ended: About 500 employees of Johns-Manville Products Corp.'s plant at Marrero, La., are returning to work after settlement of a 6½-month strike over issues dealing with compulsory overtime and temporary transfers. The settlement came only after both sides called in top officers for final negotiations: Vice-President Elwood Swisher of Oil, Chemical & Atomic Workers, and C. W. Hite, J-M's vice-president of industrial relations. The

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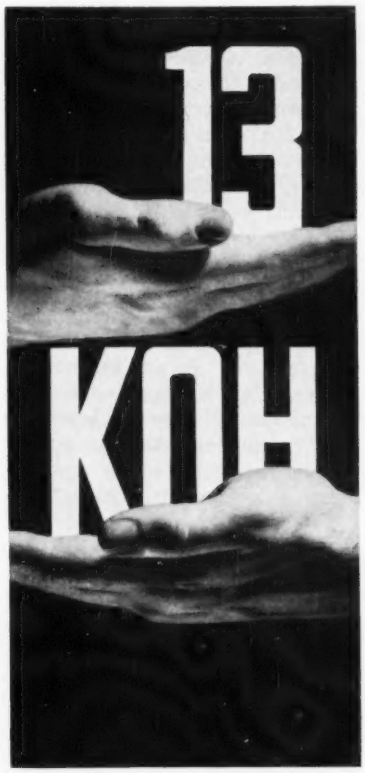

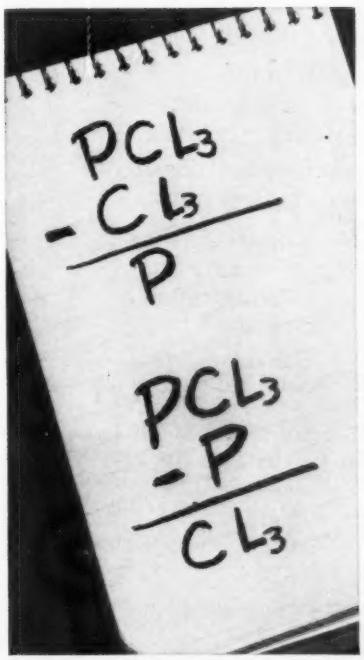

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ADMINISTRATION

new, 2½-year contract calls for a 10¢/hour wage boost, retroactive to Jan. 18, and a 9¢/hour additional increase in Jan. '61. The agreement also calls for a paid holiday on Christmas Eve and provision for holiday pay for men sick or injured during a holiday week.

•

Uranium Agreements: The first two contracts in current bargaining sessions in the uranium fields at Grants, N. M., have been signed between Oil, Chemical & Atomic Workers and Phillips Petroleum Co. and Kermac Nuclear Fuels Corp. Both companies have major uranium milling and mining installations there.

At Kermac, a contract running until March 1, '61, calls for wage increases ranging from 5¢ to 21¢/hour (averaging 14¢/hour), retroactive to last Dec. 7, improved vacation benefits, sick benefits and changes in overtime and holiday pay.

At Phillips, a one-year contract, retroactive to Dec. 18, hikes wages 10-20¢/hour.

LEGAL

Ad Charges Dropped: A Federal Trade Commission examiner has recommended the dismissal of false-advertising charges against Chas. Pfizer & Co. An FTC complaint had been made against the drug concern charging deceptive advertising of its antibiotic, Sigmamycin, by representing that fictitiously named physicians were in fact doctors who had prescribed the product. FTC's examiner found that the original advertising had been deceptive but recommended dropping the charges because the company had voluntarily abandoned the ads before it knew the commission had started an investigation, and because resumption of the advertisements was "highly improbable."

•

Dristan Case: A $200,000 suit has been filed against Whitehall Laboratories in New York federal court. Plaintiff in the case claims that he bought Whitehall's product, Dristan, after hearing advertising on television that it was nonharmful and relieved sinus colds. He alleges that the product caused him to be hospitalized. Basis of his suit: that Whitehall is negligent in not warning the public of alleged dangerous effects.

KEY CHANGES

H. W. Tripp to board of directors, Wallace & Tiernan, Inc. (Belleville, N.J.).

Fred L. Hartley to senior vice-president and board of directors, Union Oil Co. (Los Angeles).

John L. Gillis to board of directors, Chemstrand Corp. (New York).

Stuart T. Henshall to vice-president and general manager and **Eugene L. Kuryloski** to vice-president, marketing, Merck Sharp & Dohme, division of Merck & Co., Inc. (Rahway, N.J.).

C. E. Leach to vice-president, Texas Butadiene & Chemical Corp. (New York).

Grover C. Paulsen, Jr., to vice-president and technical director, Coastal Chemical Co. (Savannah, Ga.).

Richard M. Monahon to vice-president, Oil Equipment Laboratories, Inc. (Elizabeth, N.J.).

Norman W. Jennings to vice-president, marketing, and **William A. Thompson** to general sales manager, National Laboratories, Inc., subsidiary of Lehn & Fink Corp. (Toledo, O.).

L. Marshall Welch to vice-president, Petro-Tex Chemical Co. (Houston).

James A. Wold to general manager, ink and lacquer department, and **John R. Stanley** to general manager, consumer products department, The Borden Chemical Co., division of The Borden Co. (New York).

DIED

DeWitt Clough, retired president and board chairman of Abbott Laboratories, in Chicago.

RETIRED

Arthur W. Mohr, president California Spray-Chemical Corp., vice-president of California Chemical Co., both subsidiaries of Standard Oil Co. of California.

Leslie A. Miller, director and senior vice-president, Tennessee Products & Chemical Corp. (Nashville).

John J. Winterbottom, vice-president of Esso Standard Division of Humble Oil & Refining Co.

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Market Newsletter

CHEMICAL WEEK
February 13, 1960

Shell Chemical is starting up a new isoamylene unit at its Torrance, Calif., alkylation plant. The chemical will be used as raw material for Shell's polyisoprene synthetic rubber, which has a composition and properties similar to those of natural rubber.

As a result of the new isoamylene unit and production expansion going on at Torrance, its output of "synthetic-natural" rubber is expected to increase to about 20,000 tons/year. Eventually, wide availability of low-cost polyisoprene rubber may free the U.S. completely from dependence on natural rubber. (Until now the natural product has been essential in manufacture of large tires for military and civilian uses.)

But U.S. Rubber companies won't write off natural rubber for a long time. This is clearly indicated by Firestone Tire & Rubber's move to expand both synthetic rubber and natural rubber output. Firestone has recently started new rubber plantations in Brazil, Guatemala and the Philippines, and has replanted acreage in Liberia (*see also Business Newsletter, p. 17*).

Firestone spokesmen agree, however, that natural rubber supplies won't fill expected big increases in demand in the U.S.—the gap must be filled with synthetic rubber. Nonetheless, U.S. synthetic rubber capacity is now considered big enough (and it's growing fast) to relieve the country from dependency on imports in case of national emergency.

•

Dow Chemical is readying two new polyethylene film plants for near-future operation. One is at Fresno, Calif., the other at Findlay, O. The film product—Polyfilm—is aimed at construction, flexible packaging and agricultural applications.

Dow agrees with a Union Carbide spokesman's opinion that the U.S. polyethylene film industry is working into an increasingly large overcapacity (*CW Market Newsletter, Feb. 6*). But the current overcapacity situation is regarded as only temporary, and expansion now is based on expectation of big demand increases in the next few years.

•

Organic nitrate capacity will be doubled within the next two months at Chromalloy's Propellex Chemical Division plant at Edwardsville, Ill. The products go into compounding of rocket propellents.

Athough emphasis is now on rocket uses, Chromalloy's President Joseph Friedman says pharmaceutical applications are "potentially as important as rocket applications." The firm is now dickering with a drug company, may set up a joint venture to produce and market pentaerythritol trinitrate and trimethylol ethane trinitrate as replacement drugs for nitroglycerine tablets used by cardiac patients.

Chromalloy also makes 1,4 butanediol dinitrate, diethylene glycol dinitrate, polyglycidyl nitrate, triethylene glycol dinitrate.

British plastics industry scored record production and export gains in '59. According to provisional estimates by the British Plastics Federation, about 500,000 long tons of plastics were produced; that's 80,000 tons more than in '58. Export of raw materials was put at 157,000 tons, compared with 123,000 in '58.

Incidentally, the federation made its first estimate of the value of exported British plastics processing machinery—the '59 figure is $4.2 million.

•

Three major marketing shifts this week:

• Armstrong Cork Co. (Lancaster, Pa.) changed territories of five district offices of its Industrial Division to provide "more extensive coverage in less travel time."

• Food Machinery and Chemical Corp.'s Niagara Chemical Division formed a new Western Agricultural Dept. Headquartered in Fresno, Calif., the department—necessitated, the firm said, by the purchase last year of Sunland Industries, Inc.—was set up to provide faster distribution and technical and research services to growers in 11 Western states.

• Vickers Petroleum Co., (Wichita, Kans.), moved into the Nebraska-Iowa marketing territory with the creation of a new sales division headquartered in Omaha.

•

Two new developments in transportation: Union Tank Car Co. is constructing two railroad tank cars of 30,000-gal. shell capacity for use by Tuloma Gas Products Co. The cars, 85 ft. long over the couplers, will have nearly one-third more shell capacity than the largest railroad tank cars now in interchange service for transporting bulk liquid products.

And a giant reinforced-plastics cargo carrier capable of transporting a 40,000-lb. payload by rail, truck or ship is being evaluated for handling bulk cargo, according to Union Carbide Plastics Co., division of Union Carbide Corp. The container is of epoxy-glass fiber construction, weighs 2,800 lbs. (one-fourth less than comparable aluminum carriers), is claimed to be more rigid, and resistant to abrasion, fatigue and chemical and salt-water corrosion.

SELECTED PRICE CHANGES—WEEK ENDING FEBRUARY 8, 1960

	Change	New Price
UP		
Carbon black, channel, bgs., c.l.	$0.0075	$0.085
Tin metal (Straits)	0.01	1.01
DOWN		
Palm oil, clarif., tanks	$0.001	$0.12

All prices per pound unless quantity is quoted.

last year more than 150 multiwall users reduced their packaging costs thru UNION-CAMP'S

BAG CONSTRUCTION

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Phenol Makers Head for Plywood Country

Phenol producers are turning to the Pacific Northwest as the next frontier for phenolic expansions. Reason: this vast territory, on both the U.S. and Canadian sides, is the major producing area for plywood, an important outlet for phenolic-type resins.

Two companies, Dow and Reichhold, are now bidding for this market, and each has announced plans to build plants in both the U. S. and Canada. The big question now being asked by the industry: "How many of the four proposed units will be built?"

Dow has selected Kalama, Wash., as site for its new, 36-million-lbs./-year phenol unit. This plant has been scheduled to be completed in mid-'61. But the company's plans actually extend beyond phenol; it is interested in establishing an integrated chemicals and plastics manufacturing operation in the Northwest.

Dow's Canadian subsidiary is also considering an integrated chemical operation in western Canada. Last year the company optioned some property at Fort Saskatchewan, Alta., for such a complex, which would also include a phenol unit. Now the company is bidding for the large phenol market in British Columbia, and is completing purchase of property on Tilbury Island in Vancouver, B. C. Engineering is well under way for a 24-million-lbs./year plant, based on a chlorination process.

Reichhold Chemicals is also talking about building in the PNW. The company has undertaken engineering work on a $4-5-million phenol plant to be built at its industrial development tract in Tacoma, Wash. Eventual capacity is pegged at about 60 million lbs./year, while initial output potential will likely be around 30 million lbs./year. No construction has been started.

RCI is also interested in building a phenol unit on the Canadian side, is talking of a 24-million-lbs./year plant next to its Port Moody operations in British Columbia. The company is now making phenolic resins there.

Major reason for the interest in the PNW is the plywood market. Of the two plywood types, soft- and hardwood, the former has the largest share of the market, and is a large outlet for phenolic glues. Output is concentrated in the PNW—western Washington, Oregon and northern California. British Columbia is also a major producing area.

Consider growth during the past six years. In '54, production of phe-

Synthetic Phenol Capacity

UNITED STATES	Process	(million pounds) Present	New
Dow Chemical			
Midland, Mich.	Chlorination	220	—
Pacific Northwest	(1)	—	36
Monsanto			
Monsanto, Ill.	Sulfonation	110	5-10
Avon, Calif.	Sulfonation	30	—
Union Carbide			
Marietta, O.	Chlorination	85	20
Hooker Chemical			
Tonawanda, N. Y.	Chlorination	65	—
Reichhold			
Tuscaloosa, Ala.	Sulfonation	70	20
Tacoma, Wash.	Sulfonation	—	30-60
Oronite Chemical			
Richmond, Calif.	Cumene	50	—
Allied Chemical			
Frankfort, Pa.	Cumene and sulfonation	40	—
Hercules Powder			
Gibbstown, N. J.	Cumene	30	—
Shell Chemical			
Houston, Tex.	Cumene	25	—
CANADA			
Dow			
Vancouver, B. C.	Chlorination	—	24
Reichhold			
Port Moody, B. C.	—	—	20
B.A.-Shawinigan			
Montreal East, Ont.	—	28	7

(1) Will probably use a chlorination process;

nolic resins for plywood was 35 million lbs. By '59, output of these resins had climbed to almost 60 million lbs.—an increase of 70%.

And this outlet will continue strong in '60 if the softwood plywood industry, as expected, establishes its 14th consecutive record. According to the Business and Defense Services Administration, production of softwood plywood (⅜-in. basis) will be about 8.5 billion sq. ft. in '60—more than 13% over the estimated 7.5 billion sq. ft. turned out in '59. Meanwhile the hardwood plywood industry—also a phenolics user—has been moving steadily upward, and present production is about 1.8-1.9 billion sq. ft./year.

Banner Year in '59: Last year was the phenol industry's best to date. Production of natural and synthetic soared from 518 million lbs. in '58 to around 675 million lbs. As usual, most of this material (about 640 million lbs.) was synthetic; natural was slightly above 35 million lbs. The increase is even more significant in the light of the previous record—556 million lbs. in '57.

Phenolic molding powders showed a large gain, climbed above the 200-million-lbs./year mark for the first time since '56. Final tally for the year is about 220 million lbs.—a jump of almost 52 million lbs. over '58. These figures need adjustment, however, since about half of the molding resin is filler.

Use of phenolic resins classified under "all other bonding resins" by BDSA took a big jump in '59, to 20 million lbs. over '58 output, which in turn was 30 million lbs. over that of '54. Thus, '59's 62 million lbs. was a little more than 4½ times greater than in '54. It appears that this basket classification should be broken down, if possible, into some of the major items that are included in this category. This would be a big help in determining end-uses, and evaluating growth prospects.

Chemicals Show Promise: Boosting phenol consumption is the growing output of chemicals derived from phenol. In the next few years, three new chemicals outlets—caprolactam, polycarbonates and bisphenol—will surge upward.

Dow is now entering the caprolactam field, will build a 12-million-lbs./-year unit near Williamsburg, Va. The

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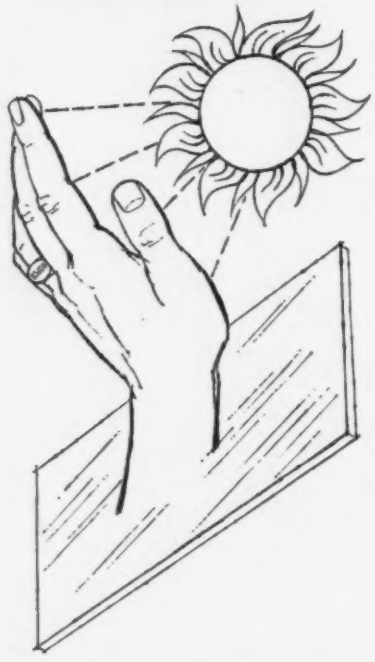

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company is now piloting caprolactam at Freeport, Tex., likely will make the product via the phenol route.

Meanwhile, Allied Chemical, which turns out caprolactam via phenol, is expanding its operations.

Within the next few months both Mobay and General Electric expect to complete their new polycarbonate resin plants.

Continuing growth of epoxy resins is also expected.

More Expansions: Producers other than Dow and RCI are also upping their phenol capacity. Monsanto has begun a major modernization of phenol facilities (which should be completed by mid-'61) at Monsanto, Ill. The output increase will be tied to other company operations — bisphenol and detergents. The company has already started construction that will increase by 50% its production capacity of bisphenol-A at St. Louis, Mo.

At Kearny, N.J., Monsanto is also building an alkylphenols unit, which will be used in the production of alkylphenol-based ethylene oxide condensates for synthetic detergents. The Kearny project should be completed sometime in the fall.

Union Carbide is also in the process of expanding its phenol operations at Marietta, O. Capacity will be boosted by 20 million lbs./year. Completion is also scheduled for later this year.

One question still being studied by phenol marketers concerns the percentage of the phenol production increase that went into inventory during '59. Two factors indicate that inventory building may have accounted for part of the exceptionally large increase in phenol production in '59. First, inventory carryover from '58 was low, and most phenol consumers were building stocks for increased business activity in '59. Second, the steel strike disrupted supplies of benzene used in phenol production and stimulated additional inventory buildup of phenol, phenolic resins and other products using phenol-derived materials.

Thus, for '60, the industry is looking for a continuation of heavy phenol demand. Because of heavy inventories, however, total output may not equal that of '59. But, at least it will be phenol makers' second best year.

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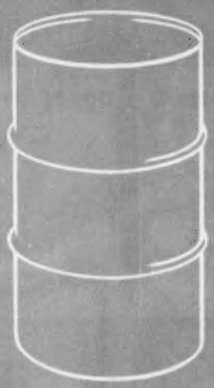
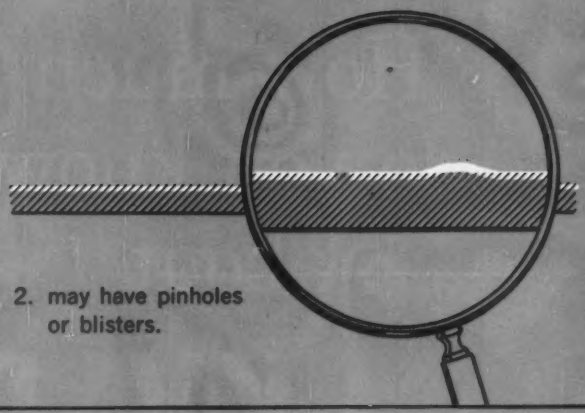
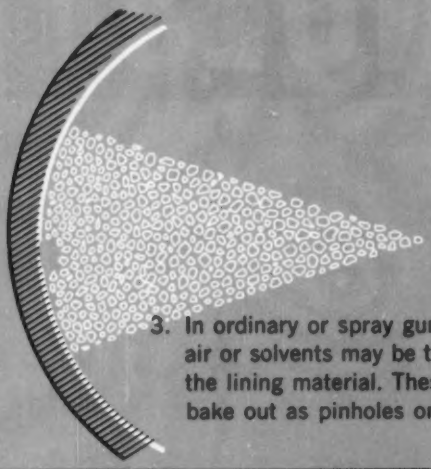


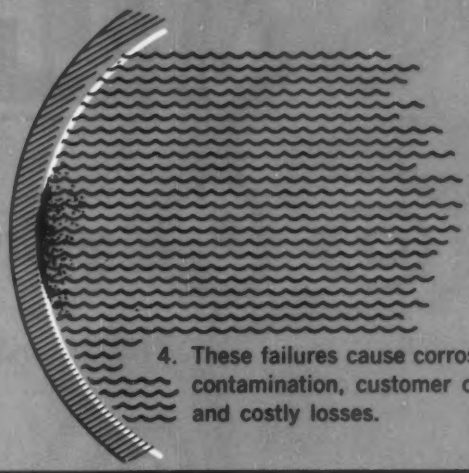
1. The lined drums you buy



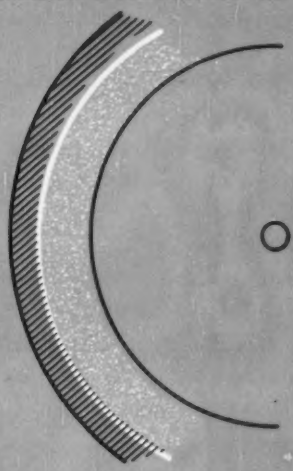
2. may have pinholes or blisters.



3. In ordinary or spray gun application, air or solvents may be trapped in the lining material. These later bake out as pinholes or blisters.



4. These failures cause corrosion, contamination, customer complaints and costly losses.



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And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of thin spots and globs or skips. Air turbulence is eliminated. Human error is eliminated. Lining thickness is controlled to within 1/10 of a mil. Linings are cured by unique Rheem Vertical Curing in three stage, high temperature ovens. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.

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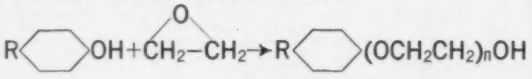
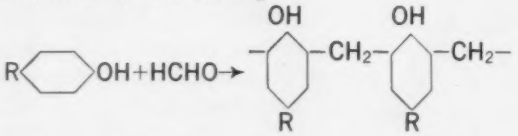
How much do you know about ALKYLPHENOLS?

OCTYLPHENOL	NONYLPHENOL	DODECYLPHENOL
OH	OH	OH
C_8H_{17}	C_9H_{19}	$C_{12}H_{25}$
white flakes	clear liquid	clear liquid

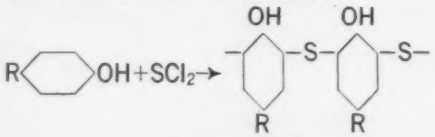
Etherification with ethylene oxide



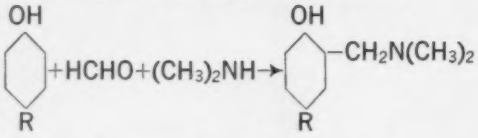
Condensation with aldehydes



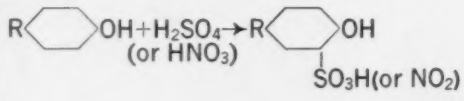
Condensation with sulfur halides



Reaction with aldehydes and amines—Formation of Mannich Bases



Sulfonation (or Nitration)

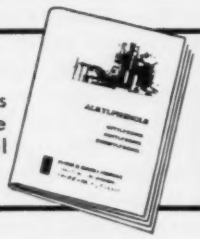


Did you know, for instance, that the three alkylphenols supplied by Rohm & Haas—octylphenol, nonylphenol, and dodecylphenol—are low-cost, reactive intermediates that can undergo etherification; condensation with aldehydes and sulfur halides; esterification (with organic and inorganic acids); nitration, sulfonation, and halogenation of the benzene ring; and many other reactions. Several of these reactions are given at the left.

Etherification with ethylene oxide gives a family of surface-active agents useful in a wide variety of applications. Calcium and barium salts of a number of alkylphenol derivatives provide lubricating- and fuel-oil additives. Condensing formaldehyde with phenol and a small quantity of an alkylphenol gives phenolic resins with improved oil solubility, water resistance, and electrical resistivity; these properties make such resins admirably suited for applications such as oil-soluble varnishes for electrical insulation. Octylphenol stabilizes ethyl cellulose against ultraviolet light degradation. Alkylphenols also offer possibilities as intermediates in making fungicides, bactericides, dyestuffs, pharmaceuticals, adhesives, and rubber chemicals.

LITERATURE AND SAMPLES

Write to Dept. SP-12 for samples and a 16-page booklet with more information on alkylphenol reactions.



Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Pros and Cons of Foreign Buying

In the year ahead, the chemical process industries will increase their purchases of chemicals from foreign suppliers (approximately $300 million worth purchased in '59, *table, p. 96*). But U. S. purchasing agents are not unaware of the pitfalls inherent in overseas shopping. They will be cautious, make strict comparisons between foreign and domestic suppliers, be inclined to pay a 10-15% price premium to domestic suppliers for such intangibles as auxiliary services, accessibility.

The pros and cons of buying abroad were thrashed out during the past two weeks at meetings in Chicago and New York of the Chemical Buyers Group of the National Assn. of Purchasing Agents.

The annual midwinter meetings – attended by several hundred PA's – featured a roundtable designed to probe their feelings about purchasing chemicals abroad. Conference participants broke up into 10 groups – two each to consider domestic vs. foreign chemical purchases from five standpoints: supply and quality reliability, auxiliary services, research, prices and pricing policies, and trade relations. Moreover, each group approached its discussion area in the light of (1) the factors bearing on a decision; (2) the price premium a domestic supplier could justify; (3) the quantity to be imported at a 15% lower price; (4) contract provisions required.

Product "X": The groups considered the purchase of 2,000 tons of pure-grade product "X," an organic chemical used both as is and as an intermediate. Product "X" actually was a

Growth of Some Major U.S. Imports

Items*	July-Dec. '57	Jan.-June '58	July-Dec. '58	Jan.-June '59
	Million dollars			
Chemicals and related products	134	141	141	170
Petroleum and products	798	799	837	842
Crude rubber (incl. latex)	179	121	128	175
Nonferrous ores and metals	634	576	447	533
Machinery	202	231	241	309
Textile manufactures	316	315	322	400

Excluding military items. Source: U.S. Dept. of Commerce.

hypothetical composite of several key chemicals now being purchased abroad.

The U. S. market for the product was 100,000 tons — 60,000 tons for use in agriculture and motor fuels, 20,000 tons in plastics, 20,000 tons in fine chemicals. The '59 world market was 150,000 tons — 35,000 tons to Europe and 15,000 to Japan, in addition to the U.S. demand.

Participants were told that four U. S. plants had a capacity of 160,000 tons in '59, two German plants a capacity of 60,000 tons, one Japanese plant 30,000 tons. Product "X" capacity in '65 was predicted at 250,000 tons for the U. S., 100,000 tons for Germany, 120,000 tons for Japan. Pure-grade product "X" was said to sell for 19¢/lb. delivered, a drop of 4¢/lb. from the '54 price.

Relative present costs (as a percent of selling price) to domestic and foreign producers of the product were:

Raw materials: 45% for U. S., 40% for Germany, 40% for Japan.

Labor: 22% for U. S., 11% for Germany, 8% for Japan.

All other charges (except duty): 13% for U. S., 13% for Germany, 13% for Japan.

U. S. import duty: from Germany, 5%, from Japan, 5%.

Profit before taxes: 20% for U. S., 31% for Germany, 34% for Japan.

Significance of Quality: The two groups discussing supply and quality reliability were concerned with the suppliers' reputation for meeting specifications. One group said it would make certain that specifications were established as a measure of quality, that quality-control checks were installed and that samples were available.

Other factors to be considered in comparing domestic and foreign suppliers, the groups said, included the total number of foreign suppliers, over-all availability of their chemical output (able to supply year-round, how much, etc.), accessibility of suppliers, shipping distances, communications, means of solving legal hassles, dealing with rejected materials, length of order lead time, packaging suitability.

Both groups agreed that domestic producers could justify a price premium ranging from 10 to 20%, depending on the suppliers' superiority in quality and service.

One group said the quantity to be bought abroad at 15% below U. S. prices would depend on competitive circumstances, the other group was willing to purchase 65% of its requirements abroad.

Five of eight PA's in one group wanted tougher, more rigid contracts with foreign suppliers; the others would settle for the same terms as those made with domestic producers.

Pricing Trends Important: Both groups discussing prices and pricing trends considered past pricing trends and the history of the price level of the product as a key comparison factor. They also wanted to know about fluctuations in supply and demand, the leaders of price boosts and the leaders of price cuts, foreign exchange and currency stability situations in supplier countries, effects of politics on prices, nationalization prospects, prospects of overcapacity, estimation of future pricing trends, technical-service prospects.

A major consideration, one group found, was the availability of "drawback" provisions (when goods are imported and used to make finished goods, which are exported, the purchaser of the imported goods can apply for a "drawback" credit on the U.S. customs duty equivalent to 99% of the duty paid). Other factors: under-the-table deals on price, tariffs and prospects for change, relation of price to profit (oddly, many participants felt that the 20% U. S. profit before taxes was too high).

Both pricing policy groups also felt domestic producers of product "X" could justify a price premium, contingent on extra service, warehousing, etc., offered.

Part of one group and all of the other would give 50% of their business to a foreign supplier, if the price abroad were 15% less, while the balance of the first group would buy a maximum of 80% foreign material.

Price protection and longer terms would be insisted on in foreign contracts negotiated by one group. The other group would insist on provisions to cover changes in currency exchange, a cancellation clause, a clause allowing price adjustment if general price levels changed.

Research Problems: The groups considering the advantages and disadvantages of foreign research, as a factor influencing purchases, saw as advantages cheaper research costs, excellent quality. As disadvantages, they cited differences in standards of testing, difficulty in getting technical service, lack of good communications, differences in procedure.

These groups also felt domestic producers could justify a price premium, largely based on the degree of technical service provided here.

However, they would buy only a "token" amount overseas in order "to keep a foot in the door to obtain advance news of new research developments." And they would want more rigid contracts abroad, calling

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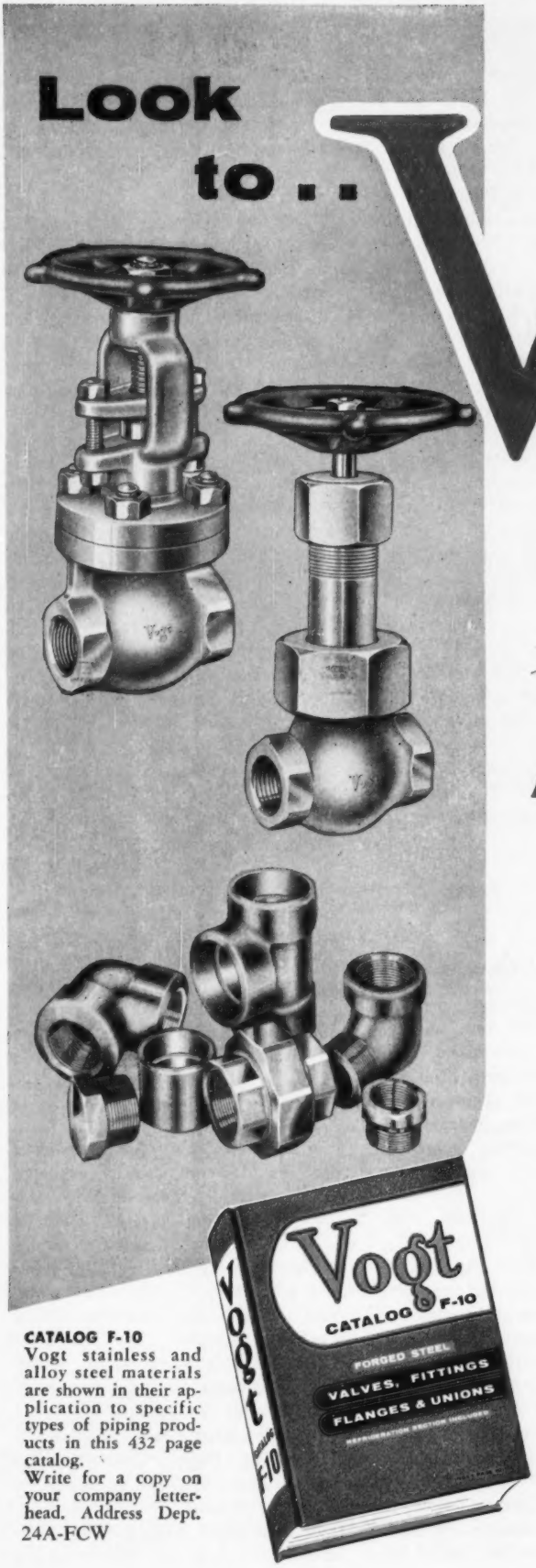

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A Different Approach: The groups on trade relations came up with a somewhat different yardstick for evaluating foreign suppliers. As factors to consider, they asked: "Do we have products to sell foreign suppliers? Do we sell them now? Do we have markets in the country in question? Is the foreign supplier a licensee, or potential licensee of ours? Will domestic customers try to censor our foreign purchases?"

On the question of price premium, these particular groups felt that both the domestic and foreign suppliers were equally good customers, that the domestic producer could not justify a price premium. With the same reciprocity thinking prevailing, they said that they would buy all their requirements abroad, that they would buy on the sellers' terms and policies.

Wrapping It Up: Most PA's agree that the domestic supplier usually can justify a small price premium—10% to 15%—for such intangibles as service and accessibility, that they would buy substantial amounts abroad at a 15% price break, but that there is a significant lack of service from foreign suppliers.

All factors considered, indicators point to continued growth in chemical imports.

New Ad Standards

Two separate moves last week, by the American Medical Assn. and the Assn. of National Advertisers, point up the growing sentiment for improved standards of accuracy and propriety in advertising. Pharmaceutical and drug specialties companies will likely be affected most by the moves.

The medical group restated (in the *Journal of the A.M.A.*) its advertising acceptance standards — unchanged for five years — and called the move a "clarification." Ethical drug (mostly prescription) producers are affected more than others by this move, since they sponsor the bulk of advertising in AMA's 11 journals.

On the other hand, proprietary (over-the-counter) drugmakers, who have been hit hard by recent FTC charges, likely will feel the effects of ANA's emergency session in New York. The ad association called for closer cooperation between advertisers and the Federal Trade Commission. It also urged better liaison between advertising organizations and media that have initiated self-regulatory procedures.

AMA's Upgrading: With the aim of placing "AMA and its publications in a position of leadership in the establishment of the ethics of pharmaceutical advertising," AMA listed certain criteria it has long used in judging ads that appear in its journals. Two key tenets have been published before:

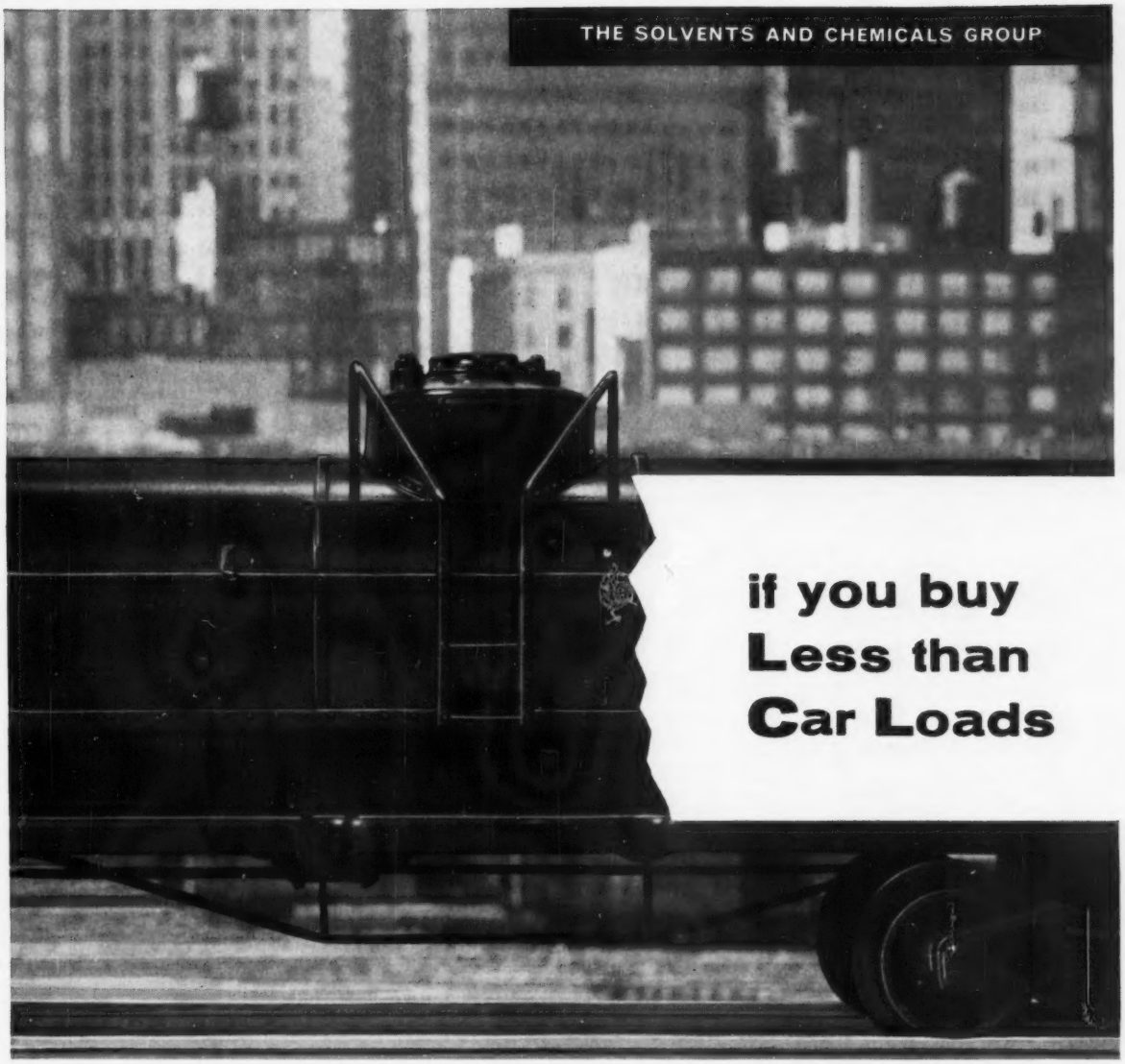
- New-drug advertising is accepted only after a New Drug Application from the Food & Drug Administration has been approved.
- Ads for only those products having a direct bearing on the practice of medicine are accepted.

But there is one new standard publicly stated by AMA: AMA may refuse advertising if it feels that ads in other media on the same product depart greatly from AMA standards. Ad men point out that this rule is really not new policy: even if the published standards haven't included this one, it has been a criterion of AMA advertising acceptance in the past.

While drug men likely will watch these developments closely, other CPI companies doubtless will keep an eye on possible effects the AMA and ANA positions might have on their advertising. Prospect: moves by other media to upgrade accuracy and taste and to avoid misleading exaggeration in advertising.

DATA DIGEST

- **Ketones:** New 48-page booklet describes 15 commercially available ketones and diketones, includes sections on shipping data, test methods and bibliography. Thirty-five tables present property data, including physical properties, viscosity, resin solubilities, liquid-vapor equilibria. Union Carbide Chemicals Co., division of Union Carbide Corp. (New York).
- **Zirconium:** Fact file has technical data on available forms of the metal. Zirconium Assn. (Cleveland).
- **Sulfur Dioxide:** Bulletin (14 pages) discusses various problems encountered in handling sulfur dioxide, both as a liquid and as a gas. Subjects treated: handling and supporting



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Atlanta 3 ..... Michael Miller, 1301 Rhodes-Haverty Bldg., JAckson 3-6951

Boston 16 ..... Paul F. McPherson, 350 Park Square Building, HUbbard 2-7160

Chicago 11 ..... Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

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Detroit 26 ..... H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main ..... Michael R. Zeynel, 85 Westendstrasse, Germany

London E.C. 4 ..... E. E. Schirmer, McGraw-Hill House, 95 Farringdon St., England

Los Angeles 17 ..... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36 ..... Knox Armstrong, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 ..... William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg., EXpress 1-1314

San Francisco 4 ..... William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

cylinders and drums, emergency handling of leaking containers, piping systems, transfer operations, measuring by weight and volume. Ansul Chemical Co. (Marinette, Wis.).

• **Agricultural Analyses:** Folder describes company's testing services for soils, fertilizers, feeds, plant tissue and insecticides. United States Testing Co. (214 Cotton Exchange Bldg., Memphis 3, Tenn.).

• **Foam-Blowing Agent:** Four-page folder gives data on urethane foams, describes blowing operations using fluorinated hydrocarbons. Chart compares physical properties of various foamed plastics with properties of other insulating materials. Industrial Chemicals Division of Pennsalt Chemicals Corp. (Philadelphia 2, Pa.).

• **Biochemicals - Radiochemicals:** Pocket-size price list tabulates price/-quantity information for hundreds of biochemicals and radiochemicals. Among those listed: amino acids and derivatives, yeasts, purine and pyrimidine compounds, enzymes, sugars and sugar phosphates, biochemical reagents. Subet Laboratories, Inc. (New York).

• **Metallic Soaps:** New booklet (36 pages) furnishes basic information on company's line of metallic soaps, including history of development, properties, uses. It provides data on stearates and palmitates of aluminum, lead, calcium and magnesium. Nopco Chemical Co. (60 Park Pl., Newark, N.J.).

• **Cast-Polyethylene Film:** Booklet discusses film production by the chill-roll casting technique, compares properties of cast, blown and quenched polyethylene film. U.S. Industrial Chemicals Co. (New York).

• **Pyridines, Piperazines:** New 20-page booklet describes properties and uses of pyridines and piperazines. Contains extensive data on physical properties, constant-boiling mixtures, solubilities, shipping, storage and handling, specification limits, test methods, physiological properties. Union Carbide Chemicals Co., division of Union Carbide Corp.

• **Pigments for Plastics:** Three new technical bulletins (1148, 1149, 1150) give instructions for using fluorescent pigments in polyester resins, polyvinyl chloride resins, polyethylene and other molding compounds. Switzer Bros., Inc. (Cleveland).

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

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Chemist: A successful plastic extrusion manufacturer in Eastern Massachusetts has opening for a degree chemist to assume responsibility of laboratory on formulation testing, quality control and new product development. Applicant must have industrial experience in compounding of vinyls for extrusions. All replies will be held in strict confidence, P-3546, Chemical Week.

Position open—wanted a graduate chemist or chemical engineer with two or more years experience in research, production or sales. Work would be in our research and development working very closely with the sales department in solving customer problems and developing new products. Send complete resume of education, experience and salary desired. P-3581, Chemical Week.

SELLING OPPORTUNITY AVAILABLE

Chemical Sales—Expansion creates need for salesman in Petrochemical Division of rapidly expanding oil company. Chemical degree and some sales experience necessary. Opportunity for advancement. Send résumé to Regional Sales Manager; Delhi-Taylor Oil Corporation; 415 Madison Avenue; New York 17, New York.

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Successful Sales Organization Available For Exporters to Benelux. Here's rare opportunity for someone seeking a distribution set-up in the Benelux area! For 12 years, with great success, our firm has represented one of the largest U.S. producers of plastic materials. Only because they are setting up their own organization, we will lose one of our major products. We are seeking new plastic and chemical lines. Excellent references. Offices in Brussels and Rotterdam. Write: Imexin S.A., 5, av. de Broqueville, 15. Brussels, Belgium.

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New Chemical Sales Agency—We are an established AA-1 manufacturer of a resin used in the paint, ink, wax, rubber, paper, candy, and pharmaceutical industries. We are located in the Metropolitan-New York area and have excellent technical personnel and are used to giving service to our customers. We have our own sales organization and have appointed manufacturer's representatives in all the principal cities. Our sales volume is over two million annually. We are interested in negotiating with domestic or foreign companies for distribution of their products, either regionally or nationally, if sales potential is highly profitable. Reply in confidence. RA-3673, Chemical Week.

Wanted: Chemical lines in N.E. area by new sales agency with contacts in rubber, plastics, and adhesive industries. P.O. Box 1254, Boston 4, Mass.

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Have chemical plant, offices and capital available. Heart of industrial area West Los Angeles. Skilled staff at your disposal. Excellent overseas connections. Submit offers in confidence to P.O. Box 25395, W. Los Angeles 25, California.

Unusual opportunity to purchase established manufacturer Liquid Soaps, Waxes and Allied Products. Located Philadelphia area. Limited capital required. BO-3617, Chemical Week.

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Chemical Specialties Manufacture—Mexico. Established, modern chemical plant, Mexico City, subsidiary AAA1 U. S. company, well equipped and staffed with bilingual Mexican chemical engineers, will undertake manufacturing and/or sales of additional chemical specialties in expanding Mexican market. Open to licensing or other arrangements, CWW-3612, Chemical Week.

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Vulcan 10' x 11' x 175' long rotary kiln, 1-3/16" shell, 2-tire. With Vulcan 7' x 70' cooler. Perry, 1415 N. 6th St., Phila. 22, Pa.

DBS Plast., Virgin Bulk 35¢. Barium Hydrx. N.F. (J. T. Baker Orig.) 15 Leverpaks $.06/lb. Triethylene Glycol Dicaprylate 10 drums $.18/lb. Toluol 10,000 gals. $.20/gal. 2 orig. drs. Polyethylene Gly. 1000, Monostearate $.20/lb 3 orig. drs. Barrett Pyridine 15A $.35/lb. 3 drs-Isoprene-Enjay virgin 15¢. Ohio Apex KP23 Plasticizer, orig. drs. 12¢ lb. 20-100 lb. drs. virgin Neopentyl Glycol. 20-100/lb. drs. virgin Trimethylol Propane. FS-3452, Chemical Week.

Phthalic Anhydride still residue approx. 300,-000# average PA content 30-35% approx. 900,000# average PA content 20% samples on request—subject to prior sale write FS-3682, Chemical Week.

Bucket Elevator Jeffrey Stainless, 8x5 Buckets, 25' center. Nortz, 67 Van Reipen Ave., Jersey City, N. J.

Goebel Brewery, Muskegon, Michigan—Liquidation of complete 50,000-75,000 bbl. annual cap. plant. Write for free illustrated circular: Mr. Maurice Osterman, Vice Pres. c/o Chas. S. Jacobowitz Corp., 3082 Main St., Buffalo 14, N. Y.

For Sale—Alvey palletizer Model 200 purchased and installed new in 1954; will handle patterns of 7 cases of 24 12-ounce, 7 cases 12 32-oz 7 cases 12 12-oz. cans, 9 cases 24 7-oz. 14 cases 12 12-oz. NR bottles; excellent condition, immediate delivery, half price. FS-3625, Chemical Week.

Lastiglas-Lined Tanks—Immediate delivery on 16 lastiglas-lined tanks, "Liked New": 12—8370 gal. 10'2" OD x 15'4" long: 4—8060 gal. 10'2" OD x 15' long; price about 1/3 of new, inspection invited. Communicate with Mr. James G. Lovelace c/o Chas. S. Jacobowitz Corp. 3080 Main St., Buffalo 14, N.Y. 'Phone AMherst 2100.

For Sale—"Niagara" stainless steel filter station 260 sq. ft. area, with stainless feeder, stainless interconnecting piping valves, etc., portable unit immediate delivery. FS-3626, Chemical Week.

For Sale—"Cleaver-Brooks" 150 HP package type, steam generator in closed food plant in Michigan automatic oil burner, all controls still erected; a real bargain. FS-3627, Chemical Week.

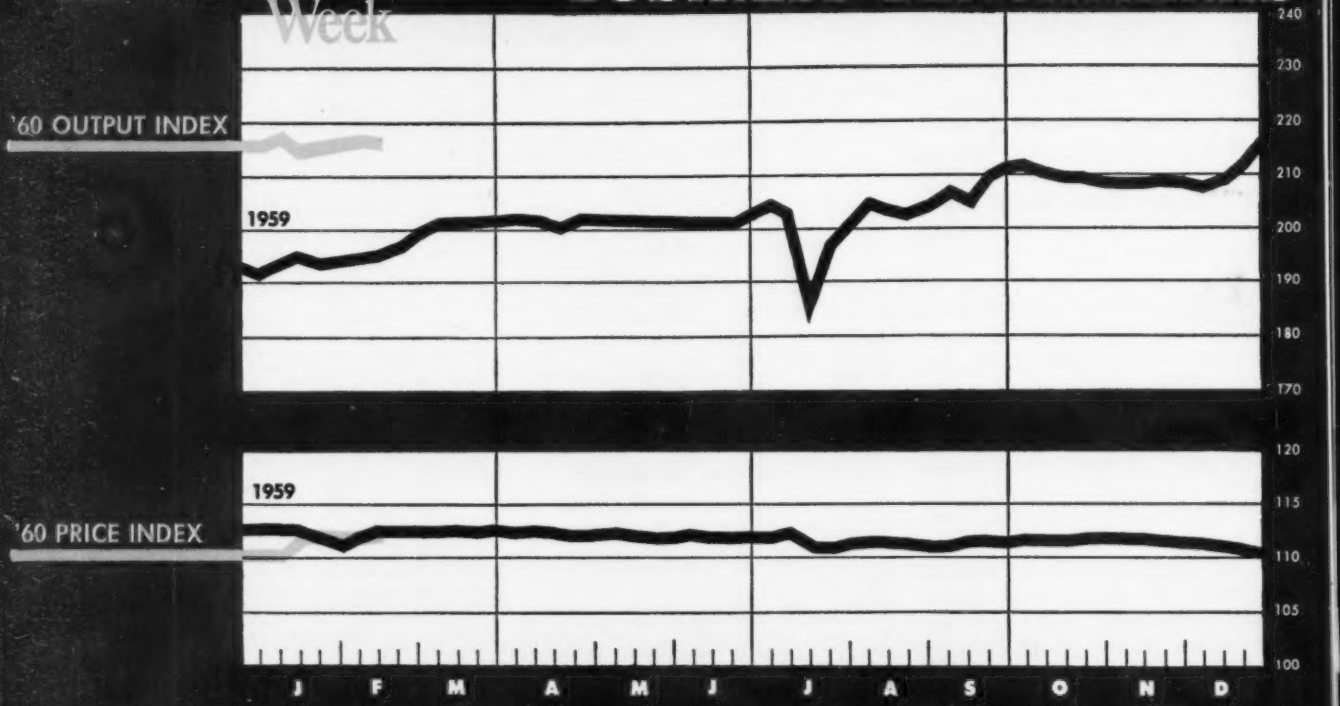
WANTED

Machinery Wanted: 66" high side Raymond mill in good condition. Write Wyo-Ben Products, P.O. Box 1979, Billings, Montana.

Sharpless Centrifuges PN14 Super D-Canter and H2 Nozliector, 304 or 316 S.S. construction. W-3629, Chemical Week.

Chemical Week

BUSINESS BENCHMARKS

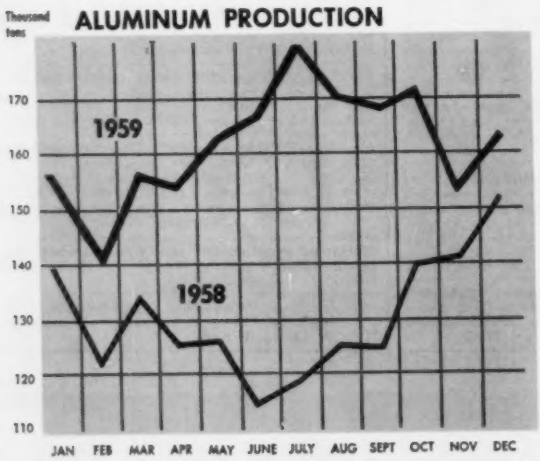


FEBRUARY 13, 1960

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1947-1949=100)	217.2	217.3	196.0
Chemical Week wholesale price index (1947=100)	112.2	111.4	111.8
Stock price index (12 firms, Standard & Poor's)	55.63	56.21	52.92
Steel ingot output (thousand tons)	2,687	2,717	2,288
Electric power (million kilowatt-hours)	14,313	14,523	13,151
Crude oil and condensate (daily av., thousand bbls.)	7,136	7,190	7,107

FOREIGN TRADE INDICATORS (Million dollars)	Exports			Imports		
	Latest Month	*Preceding Month*	*Year Ago*	*Latest Month*	*Preceding Month*	*Year Ago*
Chemicals, total	109.9	119.3	117.9	25.6	28.0	22.1
Coal-tar products	7.3	7.4	9.3	4.1	6.7	4.9
Industrial chemicals	19.4	20.9	18.0	9.5	10.6	8.6
Medicinals and pharmaceuticals	21.6	25.0	22.9	2.1	1.8	1.5
Fertilizers and materials	7.1	7.8	9.2	7.2	6.0	4.9
Vegetable oils and fat (inedible)	9.7	5.3	4.2	7.3	6.7	5.4

CHEMICAL CUSTOMERS CLOSE-UP



GULF . . . AND THE REMARKABLE PROGRESS OF PETROCHEMICALS

IN MEDICINE . . . Where does chemistry stop and medicine begin? At some point in the transition of benzene to sulfa? When a sheet of polyethylene forms an oxygen tent? When phenol changes into aspirin? When blood starts flowing through a plastic tube?

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Gulf supplies part of the momentum behind the driving potential of the petrochemical industry. For Gulf supplies the basic raw materials to begin with. Benzene, ethylene, isooctyl alcohol, propylene. Propylene trimer and tetramer, sulfur and toluene. All are produced to highest quality standards and are available for delivery on a prompt and dependable basis. Gulf stands ready to assist you with *your* contributions to medicine . . . to mankind. Write or phone: Petrochemicals Department Sales Office, Gulf Oil Corporation, 360 Lexington Ave., New York 17.

GULF

Quality Petrochemicals to Begin With

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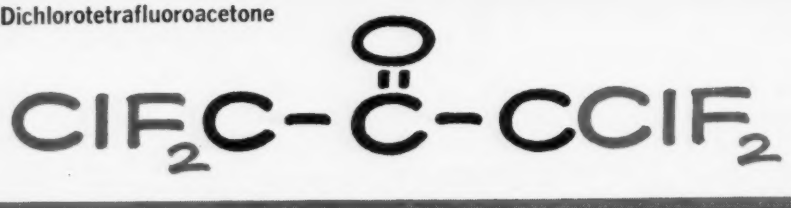
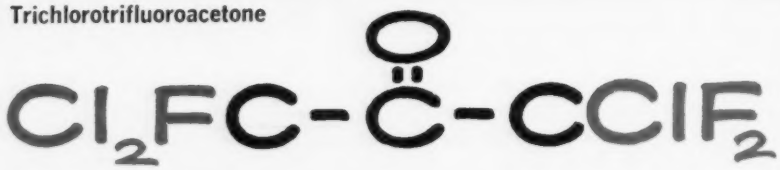
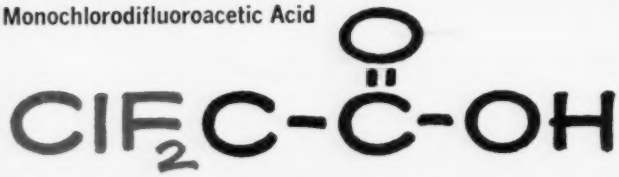
Dichlorotetrafluoroacetone



Trichlorotrifluoroacetone



Monochlorodifluoroacetic Acid



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